

Engineering Management
Field Project

Evaluating the Interstate Highway Transportation System in West Africa: Recommendations for an Integrated Highway Network

By

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Executive Summary

As West Africa invests in highway systems, the question arises as to why the highways built in West Africa do not perform and have not provided the successes similar to the highways constructed in other developing countries or regions of the world.

The West African nations should come together to create an integrated regional highway system which will benefit the region. Currently, few individual nations within the West African region claim economic prosperity as a result of their transportation system, such as Ghana and Nigeria. These nations attribute their economic success to a good highway network as well as an abundance of natural resources. Past political differences and colonial boundaries created had led to political conflicts. It is time now to help West Africa create the internal transportation network needed to promote trade within the region.

The review of materials will provide a summary of the major themes and fundamental issues and challenges of the current regional, or interstate, highway system. They are: Development Initiatives, Ease of Travel, Commerce Impediment, Economic Growth, Roadway Safety, Road Transport Cost, Funding and International Commitment.

The findings show that the US Federal Highway Act actually cost \$450 billion in 2006 dollars (adjusted for inflation). This resulted in a cost of about \$2,000 per linear foot of highway using 2006 dollars compared to the cost of about \$140 per linear foot of highway spending plan proposed by the World Bank's Development Research Group in 2006 for a highway network linking all Sub-Saharan capitals on the African continent.

For the continued development of a successfully integrated interstate highway transportation system in West Africa, the missing links need to be connected. The West African governments need to be more committed to invest in an integrated interstate highway network to facilitate the economic growth necessary to alleviate poverty.

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CHAPTER 1: INTRODUCTION

1.1 Overview and Background

This research paper focuses on the existing interstate highway transportation system in the area geographically known as West Africa. West Africa consists of 16 countries; Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. West Africa is bounded to the north by Mauritania and Mali, on the east by Niger and Cameroon, and by the Atlantic Ocean on the south and west sides (See Appendix A - Map of West Africa, Figure 1). Except for Mauritania, West Africa is part of Sub Saharan Africa. Sub Saharan Africa describes the area of the African continent that lies south of the Sahara Desert. Of the one billion people on the African continent, one out of three or 33% is West African. West Africa has a population of about 300 million people from 16 countries. The West African population is roughly the same size as the United States' population of 310 million people. The size of West Africa is 2.4 million square miles compared to 3.6 million square miles for the United States of America. Excluding Alaska and Hawaii, the United States is roughly the same size as West Africa.

There is an increasing need for an improved interstate highway system in West Africa. There currently exists a combination of paved and unpaved sections of highway with missing links. These routes that connect the various West African nations are impeding economic growth. It is increasingly difficult for West African nations to sustain their minimal economic growth and achieve an increase in competitiveness in the global

market with a mixture of adequate and inadequate interstate highways including many missing links. Therefore, there is a need to evaluate the current interstate highway transportation system in West Africa.

The construction of a Trans Africa Highway Network was first proposed and began in 1971 by the United Nations Economic Commission for Africa (UNECA) to promote regional integration and create economic prosperity. Construction projects continued for 30 years without completion of an all weathered, paved, and integrated highway transportation system in West Africa. In 2006, David Wheeler of the World Bank Development Research Group unveiled a spending plan for the 15-year \$47 billion construction of 62,000 miles of road network, linking all Sub-Saharan African capitals on the African continent, including thereby West African capitals. The highway network includes 41 cities with populations of over half a million each (Flanakin 2006).

The current interstate highway system is the Trans-West African Coastal Highway also known as the Dakar – Lagos Highway or Trans – Africa Highway 7 (TAH 7) which links 12 of the coastal nations together and the Dakar - Ndjamena Highway or Trans – Africa Highway 5 (TAH 5) which links the interior nations (See Appendix A - Map of Trans-African Highways, Figure 2). Both interstate highways are part of the Trans-Africa Highway Network currently funded and developed by the United Nations Economic Commission for Africa (UNECA) along with partners; the African Development Bank (ADB), the African Union (AU) and the international community. There remain unpaved sections of both highways that are currently viewed as unsafe with limited functionality. Each of the West African states also has its own transportation network. However, a few include interstate highways which do not extend into

neighboring countries. Appendix B shows the total length of road network and the percentage of paved roadway in each of the West African nations. Both TAH 5 and TAH 7 are two lane highways which are 80% complete and vary in length. TAH 5 is approximately 2,800 miles long and TAH 7 is 2,500 miles long. Highways or feeder roads from various major cities are proposed to connect to TAH 5 and TAH 7 to form a congruent, completely paved spatial network.

1.2 Purpose of Project

As West Africa continues to invest in interstate highway systems, the question arises as to why the interstate highways built in West Africa do not perform and have not provided the successes similar to the highways constructed in other developing countries or regions of the world. The principal purpose of this paper is to identify and evaluate current challenges and recommend improvements to the continued development of the existing highways toward a successfully integrated interstate highway transportation network in West Africa.

This research paper is organized according to several main topics. First, a literature review and a summary of key trends, themes and challenges of the current interstate highway transportation network in West Africa; then, interviews and surveys of people who have traveled the interstate highway system. Next, an evaluation of those themes and challenges and further, the interstate highway system is benchmarked with the United States interstate highway transportation system, particularly those in Kansas and Missouri. Benchmarking is used to compare and contrast the highway development process citing the US Federal-Aid Highway Act of 1956. Lastly, the conclusion will make

recommendations concerning improvements to both the current interstate highway transportation system in West Africa.

1.3 Significance of Topic

Highways are considered the road to freedom. Roads give us freedom to go anywhere and to come back home again. For decades West Africans have longed for a



transportation system that would allow for safe travel to nearby nations to visit relatives, conduct business and to explore other parts of the region. This desire has become an ordeal and has been made arduous due to deficient roads, which predicate long unsafe journeys. Only a privileged few can afford the alternative, air travel, within the region as one in two people in sub-Saharan Africa survive on less than one dollar per day.

Transportation expert Wendell Cox in 1996 described the 43,000-mile long U.S. interstate highway system as “an engine that has driven 40 years of unprecedented prosperity and positioned the United States to remain the world’s preeminent power into the 21st Century.” The basic U.S. highway system construction cost was \$129 billion ending in 1990. By 1996, the return on this nation’s greatest investment in transportation, [the highway system] since the transcontinental railroad, was already “at

least six dollars for every dollar spent in construction". Moreover, the project had created many other benefits deemed "beyond quantification" (Flanakin 2006). The value of an integrated interstate highway in West Africa is inestimable to its citizens.

An integrated interstate highway transportation network in West Africa linking the capital cities and other major cities would increase commerce by allowing the smooth flow of goods between countries and to the port cities on the coast of West Africa. The integrated interstate highway system would also facilitate development and spur economic growth in the West African region by attracting foreign investors, residential, commercial, and industrial development along its corridor. With an integrated interstate highway system in West Africa, it is expected that there would be easier traveling with travelers reaching their destinations faster and safer. The existing West African interstate highway system does not currently provide the basic highway functions nor does its forecasted future imply a greater level of success.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A literature review was conducted to assess and evaluate the current interstate highways in the West African region. The literature review highlights that Africa has had a poor history of international cooperation in road building. Colonial powers did not encourage road building. The competing Cold War superpowers also did not encourage road building even after the independence of many African nations in the 1960s despite their influence in the region. The regional West African powers had little interest in opening their territories to interstate highway building due to internal regional political conflicts. The remaining poor African nations were forced to prioritize their few resources. Scarce financial resources were directed towards internal development rather than external cooperative priorities until the 1980s, in some cases. It is no surprise then that some of the worst highways travelled are found on the African continent. Many of the highways do not even meet the definition of a road.

While the literature review uncovers Africa's late involvement in highway construction, the last several decades have witnessed a tremendous investment in interstate highway construction in the West African region. The focus of the literature review for this paper is to examine factors causing West African discontent with the condition of the interstate highways and to identify financial remedies for an integrated interstate highway system in West Africa.

2.2 Literature Review Summary

An extensive literature search of relevant journal databases, international magazines, textbooks, and reports was conducted using the University of Kansas library system, Yahoo and the World Bank databases and the search engine Google Scholar. The review of materials retrieved from the searches provided a summary and assessment of the major themes associated with the interstate highway transportation system in West Africa. Among the major themes identified in this literature review are:

- Development Initiatives
- Ease of Travel
- Commerce Impediment
- Economic Growth
- Roadway Safety
- Road Transport Cost
- Funding
- International Commitment

2.2.1 Development Initiatives

Findings from the literature review show that the majority of the roads used in West Africa for interstate highway transportation date back to the colonial era. "What the Europeans [Colonial powers] did 300 years ago? They destroyed all the existing trade routes and focused on building new trade routes that would basically draw raw materials and goods from West Africa up to Europe. In other words, they helped create a non-

economic Africa as far as internal trade.” (Flanakin) Jean Debie noted that many of the links required for regional integration are missing. The paved roads provide only patchy permanent links between West Africa’s capital cities. Debie explains that in order to gain a historic understanding of a transportation infrastructure network, it is vital to identify the social, economic and political conditions that made its construction possible. Debie went on to describe the transportation infrastructure network as the outcome of a compromise between the economic, political and technical constraints.



According to Debie, the creation of a transportation infrastructure network is a central instrument of the creation of individual territories and that explains the routes in West Africa within established boundaries.

Shemmy Simuyemba of

USAID Regional Center for Southern Africa in his report prepared for the ADB notes that “Africa needs a deliberate, systematic and concerted effort at the practical level to integrate, upgrade and modernize regional infrastructure so that it becomes the catalyst for Africa’s growth. The regionally integrated corridor approach offers prospects for speedier integration of infrastructure systems in Africa. The vision and ultimate objective for Africa should be to create a single market of 750 million people that is competitive within itself and within the global economy. A critical pre-requisite to this is regional

infrastructure integration across Africa” (Simuyemba 2000). The New Partnership for Africa’s Development (NEPAD) aims at developing an integrated socioeconomic development framework for Africa within a new partnership with donors. It is a continental plan but considers regional integration as the basis for the project.

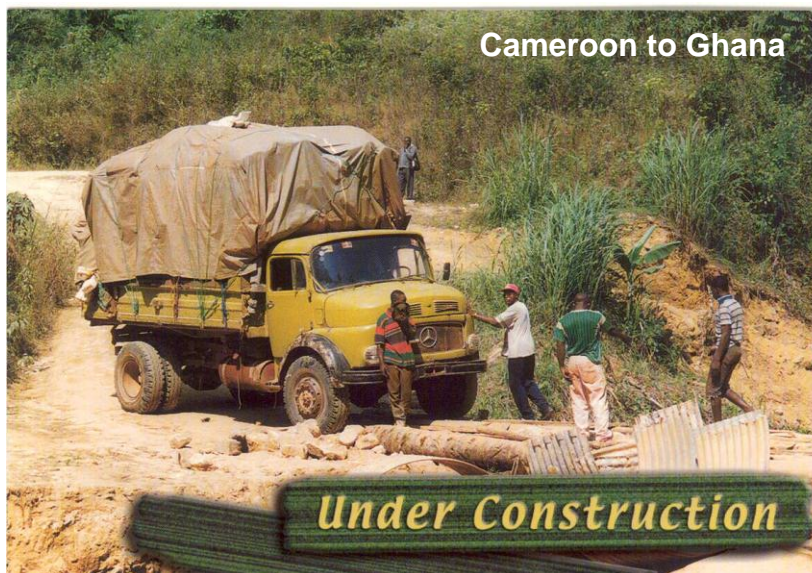
The World Bank and the African Development Bank (ADB) have both launched initiatives to encourage more integrated infrastructure development. The Bank’s Sub-Saharan Africa Transport Policy Program (SSATP) has focused on regional and national programs for transport development (World Bank, 2003). The ADB has proposed development of a transcontinental road network, with seven major road corridors in sub-Saharan Africa (ADB, 2003). Amongst the seven major road corridors are the aforementioned TAH 7 which links 12 of the West African nations together and the TAH 5 Highway which links the remaining interior nations (See Appendix A - Map of Trans-African Highways in Figure 2).

2.2.2 Ease of Travel

Another key theme of the literature review is the ease of travel along West African highways. Research indicates that traveling on West Africa’s highways can be onerous. In 2003, the African Development Bank admitted that what should be a 3-day trip from Bangua, Central African Republic, to Douala, Cameroon, can take up to 11 days and that truckers along this route were paying on average \$580 per trip to pass through various local barricades. Such trips can be lengthened by countless roadblocks and customs posts (Flanakin 2006). These barricades are often setup by local police officers under the guise of checking for current driver’s license and vehicle registration.

Drivers or truckers in violation often pay a bribe to continue on their journey. These bribes benefit the officers themselves. Sometimes, delay tactics are also used on truckers to cause them to pay more in bribery fees or else spend countless hours at these check points.

Accounts of travelers expressing frustrations were encountered throughout the literature review. Even prominent African leaders expressed their anguish with the transportation system. High-sounding pledges are noble, says Senegal's president



Abdoulaye Wade, but only action counts. "We talk about African unity, we want African unity. Meanwhile we don't even have adequate road systems to go from one country to the other. Since 1960 every country has

been building roads, but today we in Senegal can't just drive to neighboring Guinea. You can't just get up and go by road to Mali. Why? Because their roads were not our problem. Every little country wanted to build its own" (Madamombe 2006).

2.2.3 Commerce Impediment

Trade in the West African region is impeded by many factors. Some of the trade barriers included in the review are: unclear and conflicting rules and regulations by each of the various countries, high tariffs, bribery, road blocks, cumbersome customs

procedures and deteriorating roads. To be truly competitive in the global market, these trade barriers will have to be addressed. A recent World Bank study found that a 10 percent reduction in the cost of transportation on the continent would lead to a 25 percent increase in trade as the high cost of transportation is one of the key obstacles to increasing trade in Africa (Ugwu 2010). Analysts believe that an improved transportation network will be vital to enhancing trade developments in West Africa.

2.2.4 Economic Growth

While Africa's problems and economic woes will not be solved by the construction of additional roads and bridges, the literature review reveals that an integrated regional transportation system can help boost the regional economy. Ini Urua, head of the NEPAD efforts at the African Development Bank (ADB) states that a regional highway transportation system linking all the West African states should boost economic activities by a large margin, especially trade, because it will allow people and goods to easily reach local and regional markets. "This is the NEPAD vision - to remove barriers between African countries," he told *Africa Renewal*. Unreliable and costly transport services hamper the growth of businesses and discourage many from investing in Africa, he noted (Madamombe 2006).

2.2.5 Roadway Safety

While conducting the literature review, it became clear that West African interstate highways are not safe. Unpaved roads, potholes, narrow two-lane roads, sub-standard design and poor signage are among the factors contributing to unsafe road conditions. Besides improving West Africa's trade prospects, an improved interstate

highway system would benefit every West African citizen as well. The *African Economic*



Outlook 2005/2006, issued by the Organization for Economic Cooperation and Development and the ADB, states: “In 1999, about 10 percent of global road deaths occurred in sub-Saharan Africa with only some 4 percent of the world’s registered vehicles.” Better roads can

reduce accidents and save lives. Passengers also travel comfortably when roads are paved and free of dust or potholes. Children can get to schools and adults to work on time (Madamombe 2006).

2.2.6 Road Transport Cost

The high cost of transportation resonates strongly in the literature review. The review shows that West Africa has higher road transport costs than some of the industrialized nations. In fact, Joe Lamport, the Communications Officer of the West Africa Trade Hub, said that the cost of road transport in West Africa ranks among the highest in the world, making imports more expensive and finished goods less competitive in the global market (Ugwu 2010).

“It costs \$1,000 to ship a 20-foot container to the United Kingdom,” states Mathew Ackun, General Manager at Doxa Worldwide Movers, a freight company based

in Accra, Ghana. “You need \$2,300 to transport the same container just next door to Liberia. By road, our drivers can be stopped five times in Ghana, six times in Togo, six times in Benin and easily 20 times within Nigeria alone. Sometimes for good reason, to protect against highway robberies, but some officials can be abusive.” He added that he now has renewed hope that conditions could get better because of NEPAD’s efforts to improve roads and border regulations (Madamombe 2006).

It should be noted that social and political unrest, poor interstate highways, lack of competition and multiple check points are among the reasons why moving goods within the West African region is so costly. In a study of transport costs and trade, (Lima 2000) findings indicate that poor infrastructure accounts for 60% of transport costs for landlocked countries, as opposed to 40% for coastal countries. These high transport costs usually translate into high prices for goods to consumers and the loss of external competitiveness for businesses.

2.2.7 Funding

The West African Development Bank, the Danish International Development Agency and individual donor countries such as Japan are helping West African nations foot the bill for the interstate highways, in addition to funding from the ADB, UNECA, and the AU, (Madamombe 2006). The individual West African governments also obtain loans and grants from the World Bank and other financial institutions to fund the highway projects.

There were a variety of funding proposals detailed in a review of the literature. Among these proposals was that of N' Guessan N'Guessan a UNCTAD consultant. N'Guessan, in his “Improvement of Transit Transport in West Africa” report, suggested

that ECOWAS and WAEMU need to clearly identify the main road transit transport corridors and make them the focus of a construction, maintenance and facility-building effort, to be complemented by a toll system operated and approved at the community level. This toll system would make it possible to set up an ECOWAS/ WAEMU/CEMAC community Road Fund, providing a guarantee against loans in the future to complete repairs and/or the often conditional financial assistance from major international sponsors. These various corridors to be built and or maintained would be classified as the property of the ECOWAS/WAEMU, CEMAC or MOWCA communities.

2.2.8 International Commitment

Not many Westerners believe that the West African governments can fund their own transportation highways. Itai Madamombe, in the October 2006 issue of *Africa Renewal*, cited a recent World Bank estimate that it would take about 4% of Africa's gross domestic product to construct roads alone, which he admits would be "a pricey undertaking considering African countries' many other needs." Some Africans believe that the West African governments, for many more decades, will have to continue to rely on charity from the outside world to carry on the construction and maintenance of the highways in their own nations.

2.3 Findings

The literature review provided a summary of the major themes on the topic of interstate highway transportation in West Africa. The key topics identified in the review include development initiatives, ease of travel, commerce impediments, economic growth, roadway safety, road transport costs, funding, and international commitment.

After performing the literature review, it becomes apparent that interstate highways in West Africa have major functional problems. While there is an abundance of literature available, most do not provide solutions to the issues related to their interstate highway system. In most instances, the literature failed to research the underlying cause of the issues leading to such a dysfunctional interstate highway system. Also, there was an inadequate review of the interstate highway transportation system the ordinary West African envisions as there was little or no input from the ordinary West African.

There were limitations to the literature search. The project was limited to interstate highways in West Africa to narrow the research work. Literature searches provided moderate material on West African highways. Most search results with interstate highways in Africa could not be regionalized.

It should be noted that highways and bridges alone will not solve all of West Africa's problems. However, evaluating the current interstate highway system to find out how to transform these highways into an integrated highway network like those found in industrialized nations may provide a needed boost these West African nations require to achieve a higher socio-economic status.

CHAPTER 3: THE NEED FOR IMPROVED HIGHWAY SYSTEM

3.1 Current Highway Transportation System

The current interstate highway system has unpaved sections leaving travelers vulnerable to potholes and creating impassable roads during heavy rainfalls. Also, there remain missing links along the interstate highway transportation system. For instance, the Trans-West African Coastal Highway, also known as the Dakar – Lagos Highway or Trans – Africa Highway 7 (TAH 7) has no bridge to cross the River Gambia on a journey



Banjul - Barra Ferry

from Dakar, Senegal to Banjul, The Gambia. Gambia and Senegal are neighboring countries. One has to stop travelling by land and board a ferry at Barra to complete the journey to Banjul. The ferry system is often unreliable and making the crossing by ferry can add an

additional 8 hours to a trip or even include an overnight stay in Barra if the last ferry of the evening is missed.

There are many cultural and historic sites within West Africa. However, families cannot spontaneously travel freely across borders to vacation destinations. Traveling on the interstate highways can be treacherous and time consuming. The roads are mostly occupied by trucks, buses, and people traveling across borders to visit families during emergencies such a death or illness.

For this report, the existing two lane interstate highway sections have not been analyzed for current or future traffic volumes. The report will not determine whether the existing two lanes are adequate.

3.2 Key Issues

Roadway safety is a key concern of the interstate highway transportation system in West Africa. Two lane highways with opposing traffic always pose a danger to motorists and passengers. Swerving to avoid a pothole can endanger the lives of others

in the opposing traffic lane.



The interstate highway transportation system is also hampered with roadblocks, which are legally and illegally established by police and customs officers. These roadblocks delay travelers.

Police and customs officers can at times take advantage of travelers by requiring bribes before travelers can safely continue on their journey.

Another key issue with the interstate highway transportation system is the amount of time it takes to travel on these highways, even without roadblocks. It takes 8 hours to travel from Banjul, The Gambia to Dakar, Senegal some 116 miles apart. By comparison, it takes 2 hours to travel from Kansas City, Kansas to Columbia, Missouri a

distance of 121 miles. The disparity in travel times can be attributed to the road conditions of the West African interstate highway system.

The impoverished West African nations finance all of the construction and maintenance costs through loans and grants from financial institutions and international agencies such as the ADB, UNECA, and the AU. These West African nations are becoming heavily indebted in spite of not receiving all of the funding requested to cover maintenance and construction costs. The governments tend to compensate for inadequate funding by building more miles of interstate highway with less funding and thereby compromise the quality of the roadway constructed to meet the desired length of highway.

Transport costs in West Africa are among the highest in the world. The high transport cost is partially due to highway inefficiency and a highly regulated trucking industry. Poor infrastructure and a myriad of check points also contribute to the high transport costs. It should be noted that the high transport cost in West Africa is assessed to some of the poorest businesses in the world. The high cost provides a disincentive for local businesses to expand within the region.

3.3 Impact and Benefits of Improved Highway System

Highways are keys to distributing aid in West Africa. It is reported that 9 out of 10 projects fail because of a lack of interstate highway network into remote areas where the aid is vitally needed. This affects America and other donors whose charitable money is wasted when the projects do not succeed. An integrated interstate highway system could transform the West African region by providing a transportation network

that links all of the West African nations together. The project would be the biggest, life-



changing project the World Bank has ever funded. The integrated interstate highway system will provide important economic benefit to individuals and businesses by providing employment

opportunities, travel time savings, safety improvements, and increased industrial productivity.

A new and improved interstate highway transportation system will be vital to regional integration. Regional cooperation could be enhanced and the physical barriers to free trade in the region removed. Regional integration can promote free movement of people, resources, public goods, labor, and capital across national borders. Regional integration could also lead to political and cultural integration thereby enhancing unity amongst the West African nations.

CHAPTER 4: METHODOLOGY

4.1 Overview of Survey Process

Surveys were conducted in order to further evaluate the interstate highway transportation system in West Africa. The survey method was chosen as one of the principal research methods for this project as it is both convenient and provides qualitative data necessary for a deeper evaluation of the interstate highway transportation system in West Africa. The website www.surveygizmo.com was utilized to construct and administer the survey questions. The survey questionnaire was mailed out to respondents electronically. The respondents completed the questions online and then submitted the responses electronically via the Internet. The survey responses were instantaneous. The survey questions focused on topics that would provide valuable information for evaluating and recommending strategies for improvements to the development of a successful interstate highway transportation network in West Africa. Special consideration was given to the key themes identified in the literature review.

The survey candidates were selected from; (a) a list of contacts of known individuals that have travelled on the interstate highways in West Africa (b) an email broadcast to University of Kansas and University of Missouri – Kansas City students from West Africa (c) forwarding of the e-mail questionnaire by the initial list of contacts to people they know who have travelled on the interstate highways in West Africa and (d) a mass e-mail to officials from ECOWAS, ADB, AU, UNECA, NEPAD, Peace Corps, and the Transportation Department of the individual West African nations.

Despite being less personal than a face-to-face interview, this online survey format provided a larger sample size from a more diverse geographical area, including three continents. Given the topic at hand, a sample of survey participants currently living in the US who had traveled along the interstate highways of West Africa within the last decade proved challenging. The West African sample included a good representation of travelers that use those highways on a regular basis.

4.2 Survey Questions

The survey questions were developed using resources from the literature review. The questions focus mainly on the major themes recurrent in the literature review and on gathering information that would aid in evaluating the interstate highway system.

The questions in the survey cover topics ranging from how safe the travelers felt on the interstate highway, to the pleasantness of the journey, the expense of travelling on the interstate highways, how the highways compare to those in industrialized countries, their vision of an economic consequence of an integrated interstate highway, to their thoughts about the international community's commitment to highway building in West Africa.

The survey questionnaire concludes by asking the participants their opinion of the current West African interstate highway transportation system and how they believe the highway network can be improved. The survey questions are included as Appendix C in the report.

Having the local citizens participate in the interstate highway construction in West Africa is vital. The literature review does not include representative views from local

citizens. However, due to the technical aspect of the project, many of the survey participants from West Africa claimed limited transportation knowledge as attested in the number of respondents that abandoned the survey midway as the responses required some knowledge of the current transportation system. The survey questions did not follow standard survey format as the answers to the questions provided some leads for the respondents instead of requiring the respondents' opinion. This was purposely done to aid the respondents with limited background of transportation issues on the current West African interstate highway system and to encourage survey participation.

4.3 Survey Results

The survey results were compiled and the data from the survey was used for the evaluation performed in Chapter 5. There were 43 responses received within the two week time period that the survey was administered. The responses that came from participants in West African countries were 12% percent of the total received. Respondents came from West African nations including The Gambia, Senegal, Togo, and Nigeria. The remainder of the responses came from individuals that have travelled on the interstate highways in West Africa but now reside in various states within the United States, as well as some residing in the United Kingdom. Appendix E shows a World map from Surveygizmo.com indicating countries or states where respondents reside. Response data contains a Geodata section indicating the region (United States), country (Georgia), City (Decatur), postal code (30034) with the longitude and latitude of the survey response origination. Significant effort was made to compile responses from

individuals currently living in West Africa and have recently used the interstate highway system in West Africa.

Surveygizmo generated reports using all of the response data received. A report of the overall summary of the responses in the form of Pie Charts and Vertical Bar Graphs is included in Appendix F. Individual reports were generated for cross tabulated response data for individually selected questions and these reports are also included in Appendix G. The survey questionnaire results summarized in Chapter 5 will help identify new findings, evaluate the current highway system, and recommend strategies for improvement toward building an integrated interstate highway transportation network in West Africa.

4.4 Overview of Interview Process and Results

Phone interviews were conducted to gather qualitative data for research and also to supplement the survey findings. Two candidates with knowledge of the current interstate highway in West Africa were interviewed. Both interviews conducted were recorded and interview transcripts prepared. The transcripts were not included in this report in order to protect the privacy of the individuals being interviewed. The interview questions are included in Appendix D of the report.

The first candidate interviewed was Duggan Flanakin. Mr. Flanakin is the author of the article “African Highway System: Still a Dream? Modern highway network would yield billions in increased economic production to African nations”. He is the Director of Policy Research for the Committee For A Constructive Tomorrow (CFACT) based in Austin, Texas. He has written extensively on environmental education issues, the

intersection of environmental policy and human rights, and many other topics. His organization has a global presence with activities in three continents and currently ongoing activities in Uganda.

Dr. Jeggan Senghor was the other candidate interviewed. Dr. Senghor is a Senior Research Fellow at the Institute of Commonwealth Studies, School of Advanced Study at the University of London. He previously worked with the Center for African Studies at the University of London as an Associate Member and the United Nations Economic Commission for Africa (UNECA) as Special Assistant to the Executive Secretary and Director of the West Africa Office. At the UN Secretariat, Dr. Senghor served on several task forces and committees including the Task Force on Economic Cooperation among developing countries, a Panel of Experts to review study on the quest for Unity in ECOWAS, and a Panel of Experts reviewing a study on planning in developing countries among several others. Dr. Senghor holds a Master of Philosophy and a Ph.D. in Political Science from Yale University. He is the author and co-author of several books on African integration.

The results from the survey together with the interview responses were compiled and used in Chapter 5 to help identify, evaluate, and recommend improvements for an integrated interstate highway transportation network in West Africa. Each of interviewees will be provided with a copy of the report to allow them to view their contribution to the project and also review the evaluation and recommendations for improvements to the current highway transportation system in West Africa.

4.5 Overview of Benchmarking Process and Results

Benchmarking the United States interstate highway transportation system, particularly in the states of Kansas and Missouri, was performed to compare, contrast and to evaluate the existing interstate transportation system in West Africa. Most of the information on the Kansas and Missouri highway systems were readily available online or were obtained by a phone call to the Kansas Department of Transportation (KDOT) and the Missouri Department of Transportation (MoDOT). Among the KDOT and MoDOT documents examined were annual highway reports for data and statistics. Key topics addressed in benchmarking were a comparison of the initial highway investments for both the US and West Africa, functionality of the United States local transportation departments versus the West African department of transportation for each individual country, funding and maintenance of roads in the United States versus funding in West Africa, highway safety in the United States compared to West Africa and factors which make it easier to travel across the United States versus the West African region.

Phone interviews were also conducted with Kansas Department of Transportation (KDOT) officials to gather qualitative data for research and also to supplement the benchmarking findings. Three candidates were interviewed to discuss safety, funding and maintenance of Kansas highways. All three interviews conducted were recorded and interview transcripts prepared. The transcripts were not included in this report in order to protect the privacy of the individuals being interviewed.

The first candidate interviewed was the Traffic Safety Manager for KDOT Bureau of Transportation Safety and Technology, Pete Bodyk. Pete discussed KDOT's highway safety programs, funding for the safety programs and accident statistics and trends. The

second candidate interviewed was Robert Fuller, a staff engineer in construction and maintenance at KDOT. Mr. Fuller co-authored “Evaluation of a Maintenance Quality Assurance Program Using Monte Carlo Simulation”. The Maintenance Quality Assurance (MQA) program evaluates the effectiveness of maintenance activities at highway inspection sites. Robert talked about the importance of highway maintenance to KDOT, maintenance prioritization and programs, and shared inexpensive maintenance techniques. The third candidate interviewed was Alicia Johnson, a Financial and Legislative Policy Analyst at KDOT. Ms. Johnson elaborated on the sources of the KDOT highway fund and Kansas funding programs.

The benchmarking results were compiled and the results used for the evaluation performed in Chapter 5. The benchmarking results were categorized into the following; development initiatives, ease of travel, state department of transportation, commerce impediment, funding and maintenance, and highway safety.

CHAPTER 5: EVALUATION

5.1 Evaluation Using Interview and Survey Responses

One hundred per cent of respondents reported traveling on West African interstate highways. Travel occurring between the years of 2008-2010 was 55% of the time, while 26% of respondents traveled in the years 2005-2007. Fewer respondents reported traveling from 2000-2004, 19%. Combining categories of 2005-2007 and 2008-2010 equates to 81% of respondents having traveled to West Africa within the last 5 years.

Thirty-eight percent of respondents reported traveling on the Trans-West African Coastal Highway also known as the Dakar-Lagos Highway, while 26% of those who responded reported traveling on the Dakar-Ndjamena Highway. Another 43% reported traveling on other West African highways.

In addition to traveling on West African interstate highways, 86% of respondents indicated that they had traveled on highways in America, while 70% had traveled on highways in Europe. Slightly more than one third of the respondents, 37% indicated that they had traveled on highways in other parts of Africa outside of West Africa and one in ten or 12% reported traveling on highways in other parts of the world. Respondents indicated traveling in the following areas: Taiwan, China, Mexico, Brazil, Argentina, and Suriname. Three respondents indicated general geographic areas: two indicated Asia and one indicated the Middle East. Respondents were allowed to indicate multiple responses.

When asked to compare the interstate highways of West Africa with those in other parts of the world, 86% of the respondents indicated that West African interstate highways were bad. One in ten or 9% reported that they were unsure about a comparison between the interstate highways of West Africa and other parts of the world while only 5% of those taking the survey felt that West African highways were in fact good.

The length of the journey varied among travelers. Slightly less than one in five, 19%, reported traveling less than 100 miles. 36% of respondents reported traveling between 101 and 200 miles. 27% of respondents traveled between 201 and 500 miles and 17% of respondents reported traveling over 500 miles as the length of their journey in West Africa. The length of the journey for the majority was between 100 and 500 miles with 74% of travelers in this combined category.

The majority of respondents, 79% reported traveling less than 12 hours, when one combines those whose journey took less than 6 hours, 30% and those who traveled between 6 and 12 hours, 49%. Seven percent of respondents reported a journey duration of over 24 hours. One out of 5 respondents or 21% of respondents' journeys took over 12 hours in duration.

When asked about the number of checkpoint stops, fewer than one out ten, 7% reported not being stopped during the duration of their journey. Slightly less than half of the respondents, 49%, reported between 1 and 4 checkpoint stops. Thirty percent reported having to stop between 5 and 10 times during their journey. More than one-tenth of the survey respondents, 14% reported being stopped more than 10 times during the duration of their journey.

Responding to the question concerning road conditions, 21% of those taking the survey reported the interstate highways as extremely unsafe, while 37% reported the interstate highways as unsafe. When combined, 58% or slightly less than 6 out of 10 respondents reported the interstate highways as either unsafe or extremely unsafe. Others reported the interstate highways as safe, 37% or extremely safe, 5%.

Interstate highway conditions were separated into poor and good categories. Seventy percent of respondents reported the interstate highways as poor while 30% reported the highways as good. Of the respondents who indicated that the interstate highways of West Africa were good, by a ratio of 2:1 respondents had traveled on the Dakar-Lagos highway as opposed to the Dakar-Ndjamena highway. The Dakar-Lagos highway is in much better condition than the Dakar-Ndjamena Highway and thereby received a more favorable rating among respondents.

When asked why they felt the interstate highways of West Africa were poor, most respondents, 81%, replied that a lack of commitment from the West African governments was the primary reason. Respondents were allowed to select multiple responses. The second highest response from survey takers indicated political reasons with 72% of survey takers agreeing to this response. A lack of funding from the international community carried 37% of the total responses while 33% of survey takers indicated other reasons for the poor interstate highways of West Africa. The other reasons given were largely corruption followed closely by a lack of education or technical expertise and government mismanagement. "I would say the greatest impediment to the construction of interstate highways in West Africa is the lack of vision among the African people," says Duggan Flanakin of CFACT.

When considering the condition of the interstate highways, respondents were given the choices of paved, unpaved, and a combination of paved and unpaved. The majority of respondents, 81%, reported the latter, traveling a combination of paved and



unpaved sections of highway. Slightly less than one of out of ten survey takers, 9% reported traveling on completely paved sections of highway and at the exact same percentage, 9% reported traveling on completely unpaved sections of the highway.

When asked if there were missing links on the traveled interstate highways, the



majority of respondents, 64%, reported having had to use a ferry to cross a river during their journey. Of the respondents who reported having to take a ferry, 4:1 were traveling on the Dakar-Lagos highway. This highway covers a large span of coastal areas which include several waterways and rivers. Another 10% reported having had to utilize a one-lane bridge or “makeshift” bridge. While, one out three or 26% of those taking the survey reported there were no missing links during their

journey on a West African interstate highway.

Concerning ease of travel, 55% of respondents reported their journey as difficult. Another 19% reported their journey as extremely difficult. Combining those responding as difficult and extremely difficult, 74% of respondents, or 7 out of 10 described their ease of travel as difficult or extremely difficult. Seven out of the eight respondents who indicated their journey was extremely difficult also reported having had to use a ferry to cross a river at some point during their journey. Seventy-five percent of those reporting their journey as extremely difficult also categorized their journey as either unsafe or extremely unsafe. One quarter or 24% of the respondents found the journey to be easy and 2% reported their ease of travel as extremely easy.

When asked whether or not the creation of integrated interstate highways would create economic growth in West Africa, 95% of respondents replied in the affirmative. Two percent of those who responded replied in the negative and another 3% were unsure if integrated interstate highways would create economic growth in West Africa. According to the policy director of CFACT, Duggan Flanakin, the historical trade routes of West Africa were disrupted by colonization and a quest for easy access to the shipment of raw materials to Europe thereby creating a non economic Africa with regards to trade. The current attempt to re-establish internal highway trade routes is seen by the majority of respondents as a facilitator to increased economic growth.

The majority of respondents, 81%, reported corruption at police and customs checkpoints as a reason that road transport costs in West Africa are higher than those in industrialized nations. Road transport costs consist of fees paid at checkpoints by truckers to police officers and customs officials. These costs are an additional fee to the cost of transporting goods and can be quite expensive at times. Respondents were allowed multiple responses. The second most selected reason for higher road transport costs, 54% was that of the need to build additional roads and maintain existing ones. Respondents also reported, 37%, that a lack of competition causes or allows the freight companies to charge more. One out of ten or 14% of respondents reported other reasons for higher transport costs in West Africa than in industrialized nations. Of those who indicated another reason four out five pointed to government mismanagement and fraud.

Also looking at costs, respondents were asked whom they believe finances the construction and maintenance of the highways in West Africa. Over half of the respondents, 57% indicated that they believe financing of West African highways



Checkpoint in West Africa

originates from international donors. Respondents were allowed multiple responses. Thirty-eight percent indicated a combination of ADB, ECOWAS, AU and UNECA as the primary financier of highways in West Africa. Another

17% believed that there were other financiers. Included in the list of other financiers

were: the World Bank and the European Union. However, 67% of respondents indicated that they believe the West African governments themselves finance the construction and maintenance of the interstate highways in West Africa.

Respondents were questioned concerning the continuation of undertaking loans to finance the construction of West African interstate highways. The majority, 61% of respondents, indicated in the affirmative to continue taking loans as the benefits would pay off later. Another 27% responded to stop, that in the long run taking loans would hurt the impoverished West African nations. Also, voting in the negative, another 5% indicated to stop taking loans and instead rely on aid that would not have to be paid back. Lastly, 7% of respondents indicated that they were unsure as to whether West African nations should continue to take loans to finance the construction of interstate highways. “If you don’t build the infrastructure you will never build the economy that you need to be self-sufficient, however the nations are poor and don’t have the capital required to build the highway infrastructure,” reports Duggan Flanakin of CFACT concerning the modern dilemma West African nations are faced with in increasing their debt load to advance the region’s infrastructure.

The continuation of taking on underfunded highway projects by West African governments was a divided issue among survey takers. “The [international] banks don’t see the demand or have a vision for high energized trade routes in West Africa hence, they do not want to invest heavily,” according to Duggan Flanakin of CFACT. Most respondents, 71% indicated that West African nations should continue to take on underfunded interstate highway projects. However, the respondents were divided on the reasons why they should continue to do so. Respondents were allowed multiple

responses. Some 33% felt that West African nations have no choice but to build as much highway as is possible with the limited funds that are available, even if it compromises the quality of the roads. However, another 38% felt that the projects should be continued but to do so only after making necessary cutbacks to build the best roads possible. While 45% of respondents felt that the West African governments should not continue to take on underfunded projects because it causes them to compromise the quality of the highways being built by cutting corners to stretch dollars and completed highway miles.

In terms of dedicating additional dollars to interstate highway construction, 86% of respondents indicated that West African governments need to dedicate more resources to interstate highway construction. Another 14% specified other ideas related to the financing of West African highways. As well as 54% of respondents felt that the international community needs to aid West Africa more in terms of highway construction.

When asked about improving the West African interstate highway system, 44% indicated that improving highway safety is the improvement they would most like to see. Another 23% indicated that a reduction in travel time would be the improvement they would like to see the most. Following closely, 21% indicated that regional integration was the most needed improvement. Better access to cities and markets was indicated by 12% of respondents as the improvement that survey takers would most like to see.

When asked about the efforts of West African nations to cooperate with each other in terms of road building over the last 20 years, 2% considered it to be great while 49% indicated it was moderate. Forty-four percent felt that it was poor and 5% felt that

it was simply too early to tell. Of the 19 respondents who indicated that they felt the West African nations efforts in highway construction of the past 20 years was poor, 100% also indicated that they believed the condition of the roads to be poor.

Respondents were then asked to indicate the likelihood of potential outcomes from the creation of an integrated interstate highway system. Several responses were given and respondents were also allowed to included and thereby elaborate in a comment section of the question. The greatest number of respondents indicated that the creation of an integrated interstate highway in West Africa could potentially create West African unity, according to 95% of respondents. Another 30% however, indicated that it would aid in illegal drug trafficking and 19% indicated that it could create immigration problems for the wealthier West African nations. Less than one out of ten, 7% believed that an opportunity existed also for political crisis. “Illegal drug trafficking and illegal immigration are issues but the benefits [of an integrated highway transportation system] outweigh the issues. It is better to have the aids and goods reach the people of West Africa. The West African nations are only poor because they don’t have capital. They are not poor in resources. Even the poorest of the nations have resources.” Flanakin reports from CFACT.

5.2 Evaluation Using Benchmarking

Transportation is one of West Africa’s many problems. Road transportation in West Africa is perhaps the worst in the world. The United States in contrast, realized the importance of a road transportation network to connect the major cities within its 48 contiguous states. Despite each state having its own governance, the US transportation

network functions as a single skeleton, with a free movement of goods and people from one state to another. The interstate highway transportation system in West Africa is a regional transportation network that can be compared to the US interstate transportation system in size to the East Coast, the West Coast, or the Midwest region. However, there exists more paved interstate highway miles in one state in the United States than in the entire West African region. In this section, the United States interstate highway transportation system, particularly in the states of Kansas and Missouri, will be used as benchmarks to compare, contrast and to evaluate the existing interstate transportation system in West Africa in the following areas; development initiatives, ease of travel, state department of transportation, commerce impediment, funding and maintenance, and roadway safety.

Development Initiatives

The United States interstate highway system was initiated by the Federal-Aid Highway Act of 1956 also known as the National Interstate and Defense Highways Act of 1956. It was signed by President Dwight Eisenhower. The initial cost for 41,000 miles of highway was \$25 billion over a 12 year time period. However, it actually cost close to \$129 billion (adjusted for inflation, \$450 billion in 2006 dollars) and took over 35 years to complete. This resulted in a cost of about \$2,000 per linear foot of highway using 2006 dollars. This estimated linear foot cost is somewhat consistent with current KDOT and MoDOT highway construction costs.

In 2006 the World Bank's Development Research Group detailed a spending plan of \$47 billion to construct 62,000 miles of road network linking all sub-Saharan

capitals on the African continent. Funding at this level is a cost of about \$140 per linear foot of highway. The \$140 per linear foot spending plan detailed by the World Bank is much less than the United State's \$2,000 per linear foot cost for its integrated highway network resulting from the highway bill. With \$47 billion, a \$2,000 per linear foot highway could only construct 4,500 miles of a first class highway, far less than West Africa's current needs.

According to Duggan Flanakin, the disparity in cost per linear foot can be partially attributed to the fact that the US has a completely different terrain from that of West Africa. A good portion of the US interstate highways went through rugged terrain. However, in West Africa, there are the additional costs associated with mobilizing construction materials to construction sites without existing routes. One builds a mile of highway and then moves the supply line another mile to build another mile of highway since there are no secondary roads to bring the supplies down the construction route. This system is akin to building the TransAmerica Railroad lines back in the 1860s. For the US interstate highway system, the proposed highway construction in the 1950s was in areas with existing secondary routes as well as in often inaccessible areas. With other highways nearby, the cost of mobilization to get materials to the construction sites was cheaper for the building of US highways. However, without satellite technology to build the US interstate highways in the 1950s, it was more expensive than today as current road contractors have access to Geographic information systems (GIS) or geospatial information systems to quickly and efficiently survey large areas of land prior to construction.

The standard or class of interstate highways built depends on the amount invested in the highway. As long as the West African nations continue to invest less in interstate highway infrastructure, the standard of interstate highways built in West Africa will not be comparable to interstate highways built in industrialized nations.

Ease of Travel

Travelling from one West African nation to another requires multiple stops at checkpoints and borders. However, in the United States, one has to go through a Port of Entry only when entering or leaving the United States by road from Canada or Mexico. Travelling from one state to another within the United States whether in the Midwest region or the East coast can be done safely and freely without being stopped by authorities. Truckers however, are required to stop at weigh stations for weighing and to provide logs for breaks as required by law. The law allows truckers to drive a maximum of eleven hours without a break. A trucker may stop when entering and leaving a state and sometimes midway within the state. Some reputable trucking companies like Western Express have pre-passes for its truckers allowing them to bypass weigh stations.

Travelling within West Africa on the interstate highways is not easy due to road conditions. Extra caution is required when travelling at night as most highways are two lane highways. The Missouri highway system allows goods, services and commuters to flow safely and smoothly on the highways. One can travel across the state of Missouri, a distance of 240 miles in four hours without being stopped by authorities unless one is caught speeding.

According to Dr. Jeggan Senghor, the ECOWAS' Protocol on the Free Movement of Persons allows citizen from one country to travel within the region without a visa. For an integrated interstate highway network to be highly efficient, the free movement of people across borders will be vital. However, Dr. Senghor has concerns regarding the negative effects of free movement on the receiving countries. For example, in The Gambia there has been a massive increase in the numbers of citizens of West African countries residing in the country and, as has been noted by the government many skilled and unskilled occupations are now in the hands of non-Gambians. A related observation is that it is reported that over 80% of inmates in Gambian prisons are non-Gambians and some of the crimes for which they are incarcerated have been very foreign to the country. Dr. Senghor is strongly of the view that ECOWAS should undertake an evaluation of the impact of the Protocol and initiate corrective actions for negative outcomes. Governments should not wait till there is a crisis involving, for example, the expulsion of the immigrants, before taking action; this has happened in the past in countries like Ghana and Nigeria. The development of an integrated interstate highway system will facilitate the movement of persons in the region, hence the importance of this issue.

State Department of Transportation

In the United States of America, there is a Cabinet position in the Executive Branch of the US federal government called the US Department of Transportation (USDOT). Each of the states has a state Department of Transportation (DOT) as well and the DOTs are responsible for the maintenance and construction of interstate

highways within their respective states. The individual DOTs receive some funding from the USDOT each year. Construction of local roads within a state is the responsibility of the local municipalities of the state. Sometimes, the DOTs aid the local municipalities to construct roads that are next to the interstate highways. Such is the case for the Kansas Department of Transportation. Between 2000 and 2009, KDOT received about 24% of its state highway fund from the federal government. KDOT also spent about 20% on local transportation programs.

Most West African nations did not have the equivalent of a DOT until less than a decade ago. The nations now have a local Transportation Authority or a Public Works Department whose responsibility is mainly to build and maintain local roads. However, these departments do not carry a budget or have the resources to design, construct and maintain interstate highways. For a long time, construction of interstate highways was funded by loans or international donors. Design and construction of interstate highways was often by foreign companies as the West African nations lacked the expertise and resources to design and construct their own interstate highways.

Commerce Impediment

The interstate highways of Kansas provide increase opportunities for businesses to trade within and outside of the state. Goods are transported along the highways with no additional transportation fees paid as the goods are transported within the state of Kansas and across state lines to different regions within the United States. Similarly, all other states within the US transport goods along the interstate highways and across state lines without having to pay fees as the goods are transported. Even goods to and

from the United States and Mexico or Canada, can travel freely across borders due to (NAFTA) North American Free Trade Agreement.

In the West African region, commerce is impeded by: numerous roadblocks and checkpoints, high tariffs, bribery, and cumbersome customs procedures. A trucker carrying goods across West African nations is subjected to fees and or bribes at checkpoints as well as regular customs fees through each West African nation along the journey. Often, poor road conditions cause truckers additional time to reach their destinations. Options for overcoming these barriers to commerce in the short-term and long-term are discussed in the subsequent chapter.

Funding and Maintenance

According to Alicia Johnson of KDOT, the state of Kansas highway funds come from bond proceeds, sales taxes, driver licenses fees, vehicle registration fees, fuel taxes, and local and federal funds. The entire highway fund is then used for routine maintenance, local transportation programs, highway construction, buildings, management, debt service and other modal programs. There is only one toll road in the state of Kansas operated by private investor, the Kansas Turnpike Authority. Kansas legislation does not allow private partnership in highway construction as the state of Kansas invests heavily in its own highways. However, other neighboring states such as Texas and Oklahoma encourage private partnership in road building.

Funding and maintenance of the West African interstate highway transportation system is primarily from financial institutions such as the West African Development Bank, the African Development Bank and the World Bank. There is limited funding also

from the individual West African nations. Duggan Flanakin stated that “as long as it is easier for West African nations to have someone else to give them funding to do nothing, then the people in charge or the authorities will never take the initiative to do anything. With no government investment, the roads become the financial institutions’ for the better part of the highway’s life cycle. West African nations need to find creative means to create highway funding.”

The poor interstate highway conditions among other factors can be attributed to bad weather, lack of maintenance and deteriorating pavement due to heavy axial loads. Sometimes, inexpensive techniques such as crack sealing can go a long way to extend the life of the pavement said Robert Fuller of KDOT. Fuller went on to emphasize that maintenance dollars should be invested in highway sections where the most benefit would be attained. This may require forgoing maintenance in poorer highway sections and focusing on sections where maintenance would extend the pavement life significantly. When the funds are available in later years, full reconstruction would be required for the poorer sections that were forgone earlier.

Roadway Safety

According to the Chief of KDOT’s Bureau of Traffic Safety, Pete Bodyk, Kansas’ interstates provide a network of highways with a variety of safety designs that greatly reduce the likelihood of serious accidents. Travel on Kansas’ interstate highways is approximately twice as safe as travel on all other roadways in the state. There were 59 traffic fatalities on Kansas’ interstate highways in 2004. Only 12 percent of the 459 traffic fatalities that occurred in Kansas in 2004 were on the interstate system, even

though it carried 24 percent of all travel in the state in 2004. Among the safety programs implemented by the state of Kansas are: child passenger safety, click it - or ticket, over the limit - under arrest, teen/underage drinking, older drivers, motorcycles, workplace traffic safety, and college/university safe ride programs. Some of these safety programs and campaigns are at no cost to KDOT. The State Troopers while enforcing the law, educate drivers and hand out KDOT's safety brochures on the highways. The media outlets, at no cost to KDOT, run advertisements for KDOT safety programs to save lives. Independent Non for Profit Organizations such as "Moms Against Drunk Driving" work alongside with KDOT to promote KDOT's highway safety programs at no costs to KDOT.

According to *The Africa Regional Review on Transport*, road traffic accidents kill 1.2 million people in the world, of which over 225,000 or 19 percent were accounted for by deaths on African roads. In Sub-Saharan Africa alone over 70,000 deaths due to road traffic accidents were estimated to have occurred in 2000. Moreover, Africa has the highest per capita incidence of road traffic accidents. In May of 2008, ECOWAS set up a West Africa Road Safety Organization (WARSO) to help combat road crashes in the West African sub region. This is a commendable effort by ECOWAS but the organization has a lot of catching up to do. Two years later at the general assembly of WARSO held in Freetown Sierra Leone, the president of WARSO, Osita Chidoka, encouraged the establishment of a road safety office in all West African government ministries. Mr. Chidoka described the high incidence of road traffic crashes in West Africa as "pathetic". The organization addressed plans to ban the use of cell phones while driving in West Africa, the use of safety helmets, seat belts, child restraints and

road safety legislation among other road safety-related issues (FRSC, 2010). There are currently few or no safety programs or regulations on the highways in West African nations.

CHAPTER 6: SUMMARY AND RECOMMENDATIONS

6.1 Project Summary and Recommendation

As stated in the introduction to this paper, there is an increasing need for an improved interstate highway system in West Africa as the existing highways are a combination of paved and unpaved sections of highway with missing links. In order to accomplish a highly functional and efficient interstate highway transportation system like the highways in industrialized nations, the interstate highways in West Africa must be integrated. This paper has found that a regionally integrated interstate highway transportation network in West Africa will increase commerce, facilitate economic development, ease traveling, increase safety, reduce road transport costs, and provide economic growth overall. An integrated highway system in Africa as a continent will only come to fruition if an integrated West Africa interstate highway transportation system is completed and the people begin to see the economic benefit.

The primary and secondary research conducted for this paper provided a good outlook of the problems of the existing interstate highways, as well as possible improvements to the continued development of the existing highways toward a successfully integrated interstate highway transportation system in West Africa. The literature review, survey and personal interviews uncovered that while tremendous progress over the last decade has been made in highway infrastructure development in West Africa, the current interstate highway system however, remains in poor condition, unsafe, difficult to travel, non integrated, and poses an impediment to commerce. A non

integrated interstate highway network in the region ultimately leads to a non economic West Africa regarding internal trade.

A primary goal of this study was to recommend improvements towards the development a successfully integrated interstate highway transportation network in West Africa. Several improvements were determined to be critical if an integrated interstate highway transportation network were to be accomplished in the West Africa region:

- Increased highway funding investment
- Develop partnerships for funding
- Create national highway agencies
- Improve roadway safety
- Connect missing links to integrate network
- Ease traveling
- Reduce road transport cost
- Increase economic growth

The Dakar-Lagos highway is a coastal network with missing links in areas that run through swamps. Some of the technology that was used in the United States in areas such as the Louisiana Atchafalaya swamps and their use of pile driving techniques to construct the interstate highway would be a useful example. There are also many checkpoints along this route and numerous sections that are unpaved. The missing links need to be connected to create an integrated network. On the other hand, the Dakar-Ndjamena highway is the internal route for most of West Africa and the least traveled of the two interstate highways. It has more unpaved sections and is in the worst

condition. There needs to be an increase in the amount of paved sections of the interstate highway. It has a rugged terrain, which has complicated its development. The appropriate expertise must be applied to complete sections in such a rugged terrain.

The only way to decrease the length of travel is by having fewer checkpoints. Truckers who are carrying goods should have separate weigh stations where they can obtain a pass to allow them to bypass the passenger checkpoints. At such weigh stations, truckers should be subjected to the following: maximum allowable loads and time logs recording the number of hours spent on the highway and rest breaks.

Passenger checkpoints, other than official border crossings, ultimately should be eliminated and this service conducted instead by a national highway patrol for each country to identify and fine suspicious drivers and driving behavior. Individuals who are driving appropriately would not be subjected to numerous and lengthy checkpoint stops during their travels.

WARSO's (West Africa Road Safety Organization) should advocate for legislation for passenger safety laws at the national and local level in each West African nation. It is currently not an offense in many of the nations to drive without seat belts or putting a small child in a car seat. Underage driving and driving without a valid driver's license is often not prosecuted. It would be difficult to implement safety measures at the regional level without safety practices enforced at the local level. Weigh stations need to be introduced along the highways for weighing trucks and also to make sure that drivers do not drive too long and increase their potential to fall asleep behind the wheel. West Africa should look to Kansas interstate highways for an example. Kansas' interstate highways have rumble strips that help alert drivers veering off the roadway. The Kansas

interstate highways are also demarcated and signed in accordance with *The Manual on*



Uniform Traffic Control Devices, or MUTCD. There are no known engineering design guidelines common to the interstate highways in the West African region. The interstate highways lanes are not demarcated nor are the

highways adequately signed. There need to be common design guidelines for the region. The interstate highways need to be signed and striped appropriately to enhance their safety. In addition streetlights need to be introduced at major interchanges, and guardrails installed in areas with steep side slopes.

The interstate highways are substandard because the materials used for construction are inadequate, such as the aggregate for subgrade and asphalt that would not pass standards in the United States. There is also a lack of proper construction inspection, as well as inadequate funding to cover the more expensive but necessary materials for quality road construction. The more money that is available for interstate highway construction, the better the quality of the roads. There need to be more investment in construction management to ensure that interstate highways are designed and built to appropriate standards.

Highway integration will lead to economic growth as local traders will have access to regional markets. Production will automatically increase for these businesses

as demand will grow and in order to serve these markets an increase in supply becomes necessary to meet a growing need. The growth will also aid consumers with an increase in options and competitive markets which may have been dominated by single suppliers in smaller areas. This will create a vibrant economy for the West African region. Essentially the area becomes economically integrated and can compete in the global marketplace.

Fighting corruption begins with the government. The government should implement laws against fraud and bribery at checkpoints by officers. A hotline should be established to report any incidences of bribery and or fraud. This has become a common means of subsidizing wages by officers that must be eliminated in order to move forward with an integrated interstate highway transportation network.

With the growing interest in highway construction in West Africa and the tremendous effort made over the last decade, the individual West African nations will need to establish transportation departments to oversee interstate highway construction and maintenance within their respective territories. Just like the state DOTs in the US, these individual West African DOTs will need funding from their local government, ECOWAS, motor fuel tax, drivers license fees and vehicle registration fees to name a few sources of funding. Just as in Kansas and Missouri, driver licenses fees, vehicle registration fees and fuel taxes can be steps to creating a highway fund. Some of these revenues are already being collected by the nations but are not being used towards construction and maintenance of the interstate highways themselves, which are recommended.

Once an integrated interstate highway is achieved, the main priority will be the maintenance of these highways. There will be tremendous revenue costs associated with their upkeep. However, with the creation of economic growth, more revenue should be available and allocated for interstate highway maintenance. As businesses grow, taxes collected from them will necessarily increase.

Adequate funding from international financial institutions needs to include an understanding that when nations request funding, they need to receive the amount requested to eliminate the consequence of sub standard or inadequate highways being built. This is in the interest of the financial lenders to eliminate additional requests in the near future for high maintenance costs or reconstruction of the same section of highway. In addition, tighter controls over engineering design, construction management and administration by international lenders and donors are necessary to avoid West African government mismanagement of highway funds.

Private partnerships with investors should be encouraged to build toll interstate highways. Once investors have recuperated their initial investments as well as made an agreed upon level of profit, they should return the highways to the West African nations. The maintenance and operations of these toll highways will be the responsibility of the investment partners until they are handed over to the individual nations.

The West African governments need to be more committed and invest more in interstate highway construction. They have increased their commitment to highway construction in the last 10 years to some extent but they also need to step up their current level of prioritization to see an increase in economic growth as a result of an integrated interstate highway system. It should be their number one priority because

without an integrated interstate highway network in the region, they will never experience economic growth that is needed to alleviate the poverty that currently plagues most West African nations.

Ongoing civil wars, military dictatorships, political unrest are just a few of the political issues which are currently impeding the progress of an integrated interstate highway network in the region. The issue of the safety for construction workers in some nations will have to be addressed. This is a matter for the United Nations and ECOWAS. The opening of each nation for easy travel by an integrated interstate highway network allows for the possibility of increased immigration and drug trafficking. A regional study should be enacted to evaluate the negative impact to the West African nations after completion of an integrated interstate highway system. Ways to combat these issues or minimize their effects should be the primary focus of this study.

The nations can come together as one to create this integrated highway system as it will benefit all of them tremendously. Currently, individual nations can claim prosperity as a result of their transportation system within their local region, such as Ghana and Nigeria. They can attribute their economic success to a good road network as well as an abundance of natural resources. Past political pressures should be put aside to focus on the interests of the inhabitants to the region. Colonial boundaries arbitrarily created in the past led to internal political conflicts. Colonial powers created an environment without an internal transportation network as their network simply took resources away from Africa to Europe. It is time to help Africa create an internal network that is needed to promote trade within Africa. Until such task is accomplished, colonial powers should still be held responsible for the economic plight of Africa.

A grade of “D” is assessed to the current interstate highway transportation system. Until the above recommendations are made, the current interstate highway transportation system might even grade below its current standard. In order to move forward with the recommendations given, the project would require construction phases for completion. Phase 1 includes completing an all-weather 2-lane TAH 5 and TAH 7 interstate highways with their missing links. Phase 2 should be the completion of the construction of an integrated network linking all West African nations and capitals. Phase 3 would be the construction of another 2-lane of all-weather highways parallel to the existing interstate highways to be used ultimately as a 4 lane divided highway with 2 lanes in each direction. Ideally, Phase 3 would be operational in the year 2030.

6.2 Recommendations For Additional Work

The literature research and personal interviews conducted point to the need to identify the missing links. These missing links are vital to an integrated interstate highway transportation system in West Africa. Until all of the missing links are identified, studied and programmed for construction, an integrated interstate highway system will never be accomplished. NEPAD as part of its Program for Infrastructure Development in Africa (PIDA) for regional integration should give priority to the missing links along the West African region for an integrated interstate highway network.

Another area of concern detailed in this report is the negative impact of the free movement of people across the West African nations once a regionally integrated interstate highway system is achieved. Research shows that the potential benefits of an integrated interstate highway network will outweigh the negative impact. However,

studies need to be conducted to evaluate the negative impact and recommend strategies to resolve or minimize the impact.

ACRONYMS AND ABBREVIATIONS

ADB	African Development Bank
AU	African Union
CEMAC	Central African Economic and Monetary Community
EC	European Commission
ECA	Economic Commission for Africa
ECOWAS	Economic Community of West African States
EU	European Union
GDP	Gross domestic product
GIS	Geographic Information System
ICA	Infrastructure Consortium for Africa
IMO	International Maritime Organization
IRF	International Road Federation
JICA	Japanese International Cooperation Agency
LVSR	Low Volume Sealed Road
MDG	Millennium Development Goal
MOWCA	Maritime Organization of West and Central Africa
NEPAD	New Partnership for Africa's Development
NTB	Non Tariff Barrier
OSBP	One-Stop Border Post
PIDA	Program for Infrastructure Development in Africa
PPP	Public-Private Partnership
PRS	Poverty Reduction Strategy
PRTSR	Poverty Reduction & Transport Strategy Review
REC	Regional Economic Community
RIT	Regional Integration and Transport
RMF	Road Management and Financing
RTTP	Rural Travel and Transport Program
SARPs	Standards and Recommended Practices
SIDA	Swedish International Development Cooperation Agency
SPIDA	Strategy and Program for Infrastructure Development in Africa
SQ. KM	Square Kilometer
SSA	Sub-Saharan Africa
SSATP	Sub-Saharan Africa Transport Policy Program
TAH	Trans African Highways
TCC	Transport Coordination Committee
UEMOA	West African Economic and Monetary Union
UNCTAD	United Nations Conference on Trade and Development
UNECA	United Nations Economic Commission for Africa
UNTACDA	United Nations Transport and Communications Decade
USAID	United States Agency for International Development
USOP	Universal Safety Oversight Program
WAEMU	West African Economic and Monetary Union
WARSO	West Africa Road Safety Organization
WB	World Bank

APPENDIX A

Figure 1 – Map of West Africa

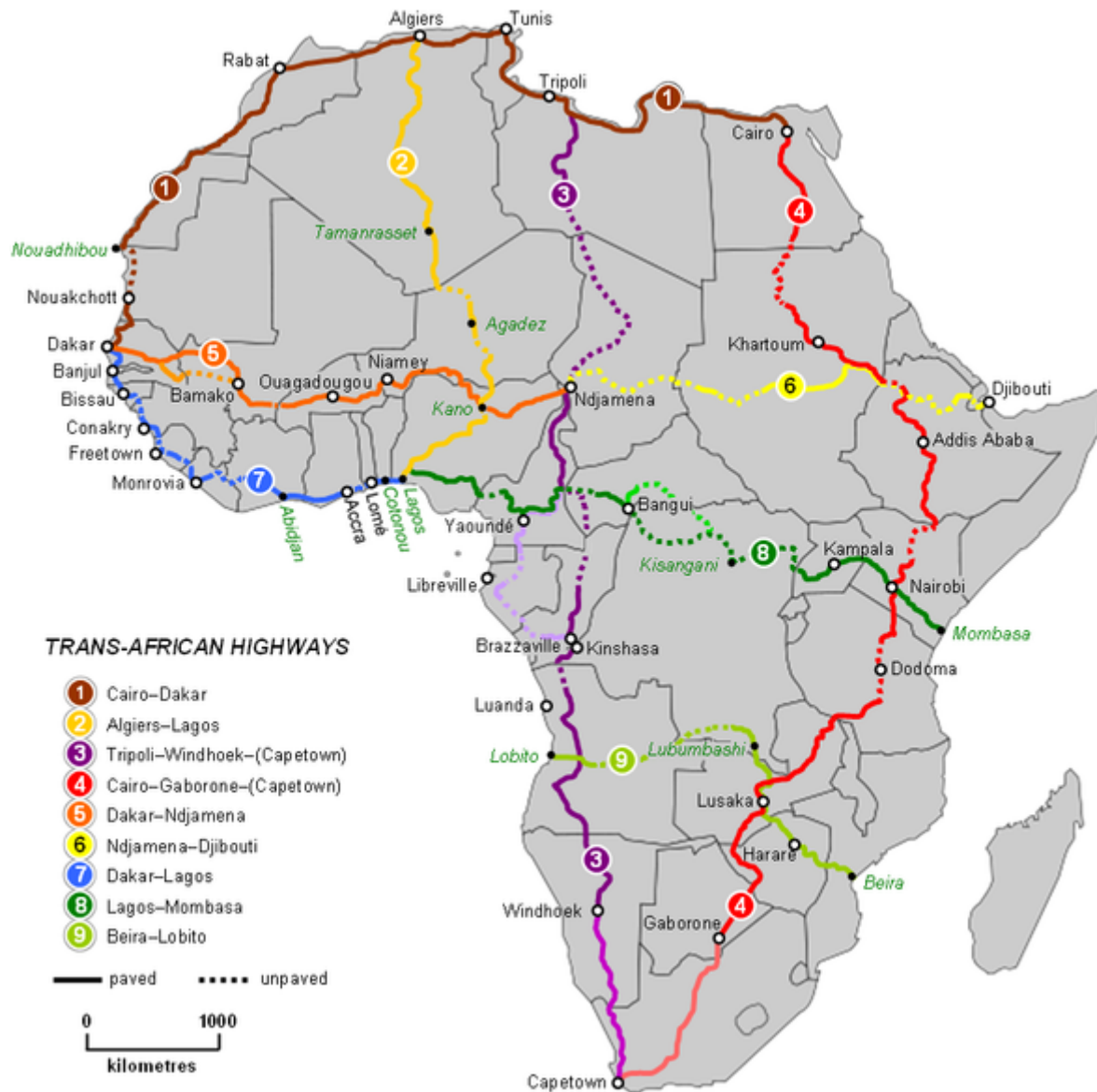


Legend

— Boundary of West Africa

Figure 2 – Trans-African Highways

Map Showing TAH 5 and TAH 7 Referenced above



APPENDIX B

Percentage of Total Roads Paved (%)								
	Year							
Country Name	2000	2001	2002	2003	2004	2005	2006	2007
Benin					10			
Burkina Faso					4			
Cameroon	8				8			
Cape Verde	69	69						
Chad	1							
Cote d'Ivoire	10				8			
Gambia, The	35			19	19			
Ghana	30	18		18		15		
Guinea	17			10				
Guinea-Bissau			28					
Liberia	6	6						
Mali	12				18			
Mauritania	11					30	27	
Niger		26	26	25	20	21	21	21
Nigeria					15			
Senegal	29			29				
Sierra Leone	8		8					
Togo	32	32						
Source - Worldbank Database								
Total Road Network (km)								
	Year							
Country Name	2000	2001	2002	2003	2004	2005	2006	2007
Benin					19,000			
Burkina Faso					92,495			
Cameroon	50,000				51,346			
Cape Verde	1,350							
Chad	33,400					40,000	40,000	
Cote d'Ivoire	50,400				80,000			
Gambia, The	2,700			3,742	3,742			
Ghana	39,409			47,787	54,311	57,614		
Guinea	30,500			44,348				
Guinea-Bissau			3,455					
Liberia	10,600							
Mali	15,100				18,709			
Mauritania	7,660					9,144	11,066	
Niger			14,657	15,074	18,387	18,423	18,550	18,951
Nigeria					193,200			
Senegal	14,583			13,576				
Sierra Leone	11,330		11,300					
Togo	7,520							
Source - Worldbank Database Note: 1km is equivalent to 0.62 miles								

APPENDIX C

Survey Questionnaire

1. Have you ever travelled on a highway in West Africa?
 - a. Yes
 - b. No
2. When did you travel last?
 - a. 2008-2010
 - b. 2005-2007
 - c. 2000-2004
3. Have you travelled on the following West Africa highways?
 - a. Trans-West African Coastal Highway / Dakar – Lagos Highway
 - b. Dakar – Ndjamena Highway
 - c. Other
4. How far was your journey?
 - a. Less than 100 miles
 - b. 100 to 200 miles
 - c. 201 to 500 miles
 - d. Over 500 miles
5. How long was your journey?
 - a. Less than 6 hours
 - b. 6 to 12 hours
 - c. 13 to 24 hours
 - d. Over 24 hours
6. How many checkpoints did you stop at?
 - a. none
 - b. Less than 5
 - c. 6 to 10
 - d. More than 10
7. Describe travelling on the highways in West Africa

- a. Safe
 - b. Extremely safe
 - c. Unsafe
 - d. Extremely unsafe
8. What were the highway conditions?
- a. Poor
 - b. Good
 - c. Excellent
9. The highway can best be described as
- a. Paved
 - b. Unpaved
 - c. Combination of paved and unpaved sections
10. Were there missing links on the highway?
- a. No, there were none.
 - b. Yes, I had to use a ferry to cross a river
 - c. Yes, I had to get on a one-lane bridge or “makeshift” bridge
11. How would you describe the ease of travel on the highway?
- a. Easy
 - b. Extremely Easy
 - c. Difficult
 - d. Extremely Difficult
12. Do you believe integrated highways in West Africa would help create economic growth?
- a. Yes
 - b. No
 - c. Not sure
13. Road Transport cost in West Africa is higher than that in industrialized nations because of
- a. Corruption at police and custom check points
 - b. The money is needed to maintain and built more roads
 - c. Lack of competition causing freight companies to charge more
 - d. None of the above
14. Who do you believe primarily finances the construction and maintenance of the highways?

- a. The West African Governments
 - b. The ADB, ECOWAS, AU and UNECA
 - c. International donors
 - d. All of the above
15. Should the impoverished West African nations continue to take loans to build highways?
- a. Yes. The benefits will pay off
 - b. No. It will hurt them in the long run
 - c. No. They can rely on aid
 - d. Not sure
16. What is your opinion of the highways in West Africa?
- a. West African Governments need to dedicate more resources to highway construction
 - b. The international community needs to aid West Africa in highway construction
 - c. More roads mean more maintenance cost
17. Which benefit would you most like to see improve in the highway system?
- a. Roadway safety
 - b. Ease of travel (Reduced travel time)
 - c. Trade
 - d. Regional integration
18. What other country's highways have you travelled? (Check all that apply)
- a. Other African countries
 - b. Europe
 - c. America
 - d. Other, please specify
19. How do West Africa highways compare to highways in other parts of the world?
- a. Good
 - b. Bad
 - c. Not sure
20. What are the reasons for poor highways in West Africa? (Check all that apply)
- a. Lack of commitment from the governments
 - b. Lack of funding from the international community
 - c. Political Issues
 - d. Other

21. Should West African nations undertake underfunded highway projects? (check all that apply)
- a. Yes, they have no choice but to build as much highway as possible with the limited funds available
 - b. Yes, only after making the necessary cutbacks to built the best roadway possible
 - c. No, they will compromise the quality of the highway built by cutting corners
22. A first class regional highway transportation system in West Africa can potentially create (check all that apply)
- a. West African Unity
 - b. Immigration problem for wealthier nations
 - c. Opportunity for political crisis
 - d. Illegal drug trafficking
23. Africa has a poor history of international cooperation in road building. How would you consider the West African nations efforts in highway construction over the last 20 years?
- a. Great
 - b. Moderate
 - c. Poor
 - d. Too early to tell
24. Assess a grade to the highways in West Africa
- a. A
 - b. B
 - c. C
 - d. D
 - e. E
 - f. F
25. How long will it take West Africa to complete an integrated regional highway transportation system?
- a. Less than 10 years
 - b. 10 to 25 years
 - c. 26 to 50 years
 - d. Over 50 years
26. As a traveler what are some of the improvements you would like to see on the highways in West Africa? (Optional. Please feel free to add your comments).

APPENDIX D

Interview Questionnaire

1. How is construction and maintenance of the highways financed in West Africa?
2. Should the impoverished West African nations continue to take loans to build highways and be heavily indebted?
3. What are the potential benefits of a regionally integrated highway in West Africa?
4. Why is Road Transport cost in West Africa higher than that in industrialized nations?
5. What would you like to see improve the most in the highway system?
6. Should West African nations undertake underfunded highway projects?
7. Africa has a poor history of international cooperation in road building. How would you consider the West African nations efforts in highway construction over the last 20 years?
8. How can we improve safety on the highways of West Africa?
9. How long will it take West Africa for a first class regional highway transportation system?
10. Any other comments and or suggestions?

APPENDIX E

Map of Response Origins

Preview Survey



APPENDIX F Summary of Responses



Online Surveys, Data Collection and Integration
www.SurveyGizmo.com

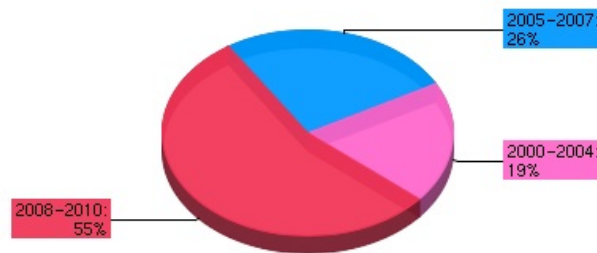
Summary Report – Nov/08/2010



Have you ever travelled on a highway in West Africa?

Value	Count	Percent %
Yes	43	100%

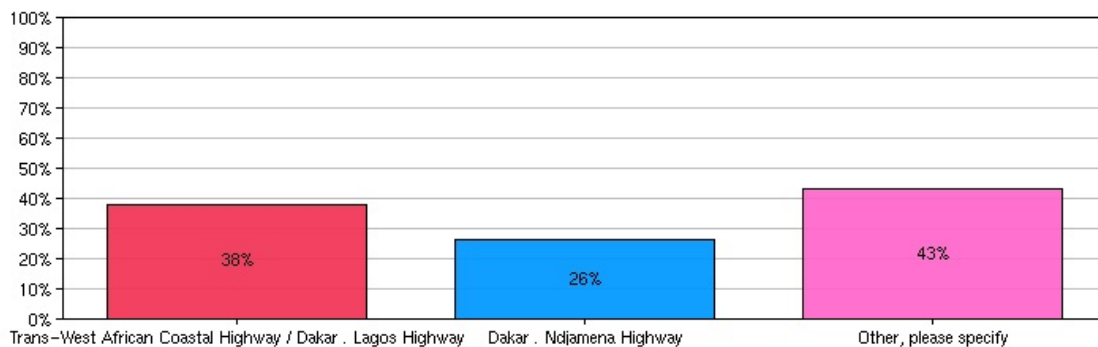
Statistics	
Total Responses	43



When did you travel last?

Value	Count	Percent %
2008-2010	23	54.8%
2005-2007	11	26.2%
2000-2004	8	19%

Statistics	
Total Responses	42
Sum	84,239.0
Average	2,005.7
StdDev	3.04
Max	2,008.0

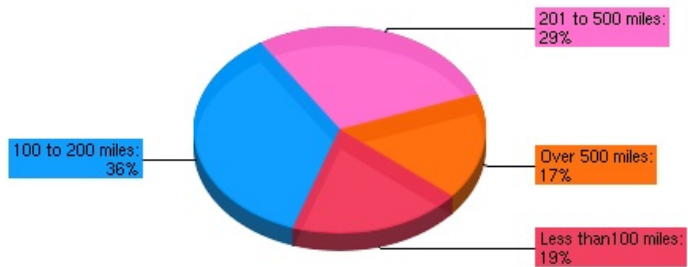


Have you travelled on the following West Africa highways? (check all that apply)

Value	Count	Percent %	Statistics
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Trans-West African Coastal Highway / Dakar — Lagos Highway	16	38.1%
Dakar — Ndjamena Highway	11	26.2%
Other, please specify	18	42.9%

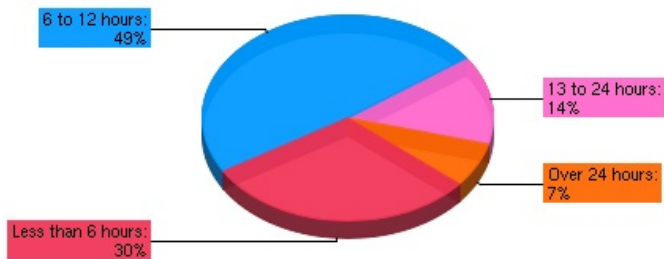
Total Responses	42
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How far was your journey?

Value	Count	Percent %
Less than 100 miles	8	19%
100 to 200 miles	15	35.7%
201 to 500 miles	12	28.6%
Over 500 miles	7	16.7%

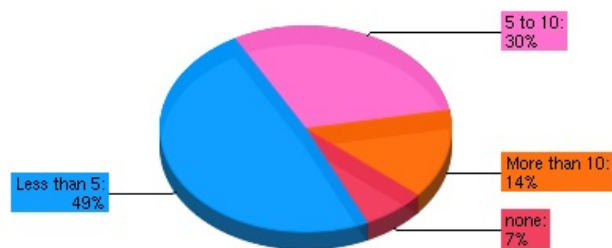
Statistics	
Total Responses	42
Sum	3,900.0
Average	144.4
StdDev	49.69
Max	200.0



How long was your journey?

Value	Count	Percent %
Less than 6 hours	13	30.2%
6 to 12 hours	21	48.8%
13 to 24 hours	6	14%
Over 24 hours	3	7%

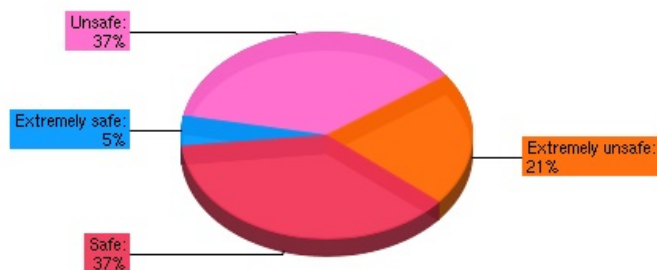
Statistics	
Total Responses	43
Sum	198.0
Average	7.3
StdDev	2.49
Max	12.0



How many check points did you stop at?

Value	Count	Percent %
none	3	7%
Less than 5	21	48.8%
5 to 10	13	30.2%
More than 10	6	14%

Statistics	
Total Responses	43
Sum	65.0
Average	5.0
Max	5.0



Describe travelling on the highways in West Africa

Value	Count	Percent %
Safe	16	37.2%
Extremely safe	2	4.7%
Unsafe	16	37.2%
Extremely unsafe	9	20.9%

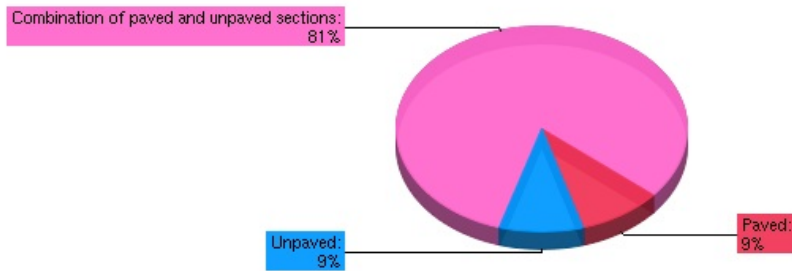
Statistics	
Total Responses	43



What were the highway conditions?

Value	Count	Percent %
Poor	30	69.8%
Good	13	30.2%

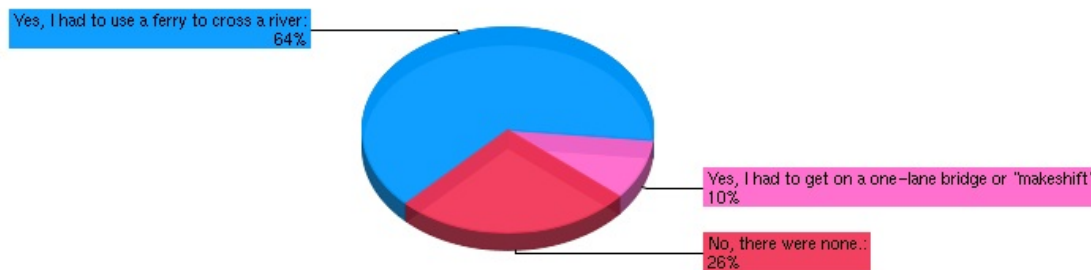
Statistics	
Total Responses	43



The highway can best be described as

Value	Count	Percent %
Paved	4	9.3%
Unpaved	4	9.3%
Combination of paved and unpaved sections	35	81.4%

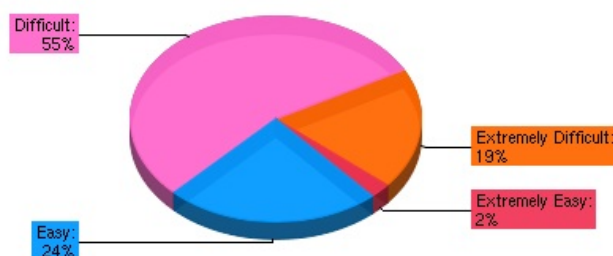
Statistics	
Total Responses	43



Were there missing links on the highway?

Value	Count	Percent %
No, there were none.	11	26.2%
Yes, I had to use a ferry to cross a river	27	64.3%
Yes, I had to get on a one-lane bridge or "makeshift" bridge	4	9.5%

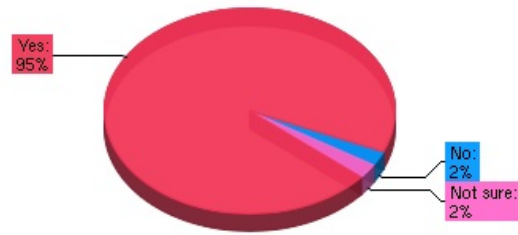
Statistics	
Total Responses	42



How would you describe the ease of travel on the highway?

Value	Count	Percent %
Extremely Easy	1	2.4%
Easy	10	23.8%
Difficult	23	54.8%
Extremely Difficult	8	19%

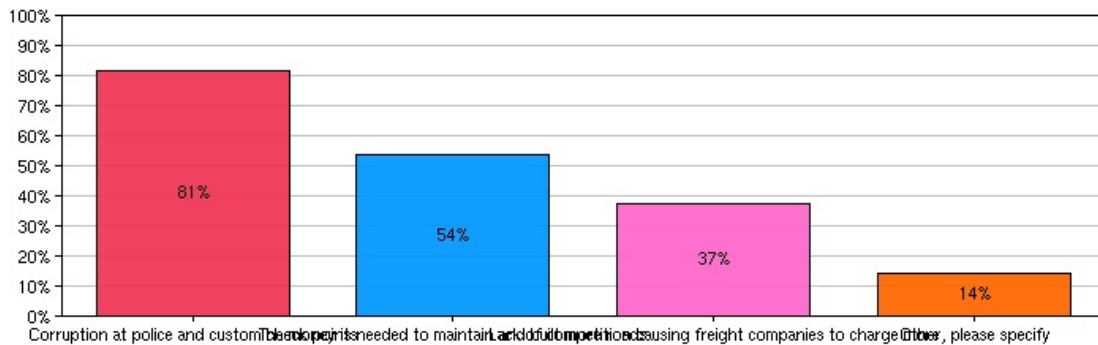
Statistics	
Total Responses	42



Do you believe integrated highways in West Africa would help create an economic growth?

Value	Count	Percent %
Yes	41	95.3%
No	1	2.3%
Not sure	1	2.3%

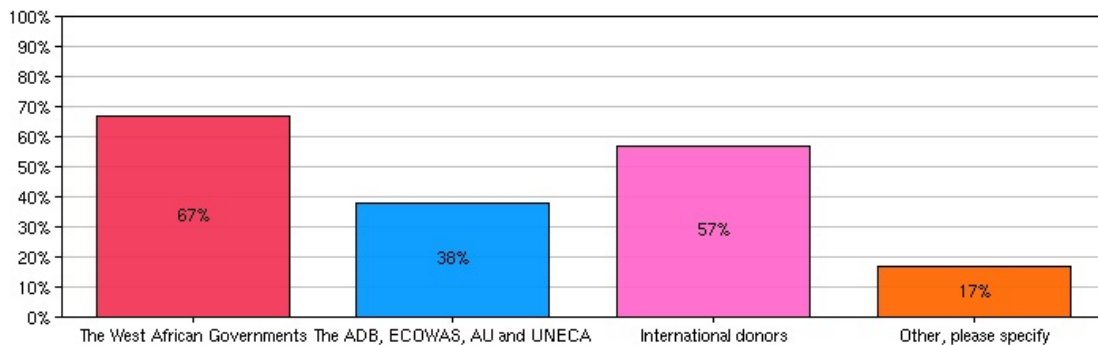
Statistics	
Total Responses	43



Road Transport cost in West Africa is higher than that in industrialized nations because of (check all that apply)

Value	Count	Percent %
Corruption at police and custom check points	35	81.4%
The money is needed to maintain and built more roads	23	53.5%
Lack of competition causing freight companies to charge more	16	37.2%
Other, please specify	6	14%

Statistics	
Total Responses	43



Who do you believe primarily finances the construction and maintenance of the highways? (check all that apply)

Value	Count	Percent %
The West African Governments	28	66.7%

Statistics	
Total Responses	42

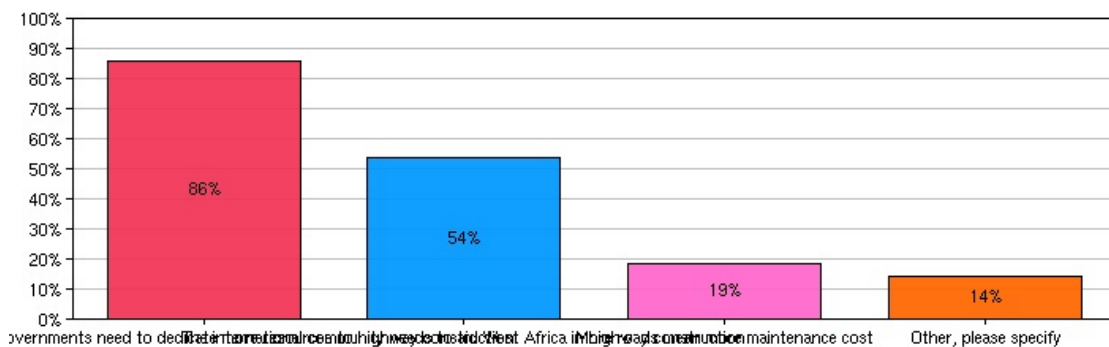
The ADB, ECOWAS, AU and UNECA	16	38.1%
International donors	24	57.1%
Other, please specify	7	16.7%



Should the West African nations continue to take loans to build highways?

Value	Count	Percent %
Yes. The benefits will pay off	25	61%
No. It will hurt them in the long run	11	26.8%
No. They can rely on aid	2	4.9%
Not sure	3	7.3%

Statistics	
Total Responses	41



What is your opinion of the highways in West Africa? (check all that apply)

Value	Count	Percent %
West African Governments need to dedicate more resources to highway construction	37	86%
The international community needs to aid West Africa in highway construction	23	53.5%
More roads mean more maintenance cost	8	18.6%
Other, please specify	6	14%

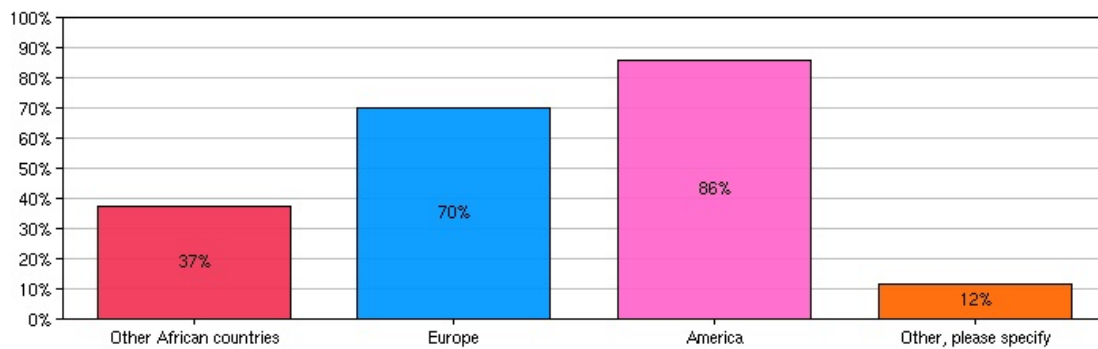
Statistics	
Total Responses	43



Which benefit would you most like to see improved in the highway system?

Value	Count	Percent %
Roadway safety	19	44.2%
Reduced travel time	10	23.3%
Better access to cities and markets	5	11.6%
Regional integration	9	20.9%

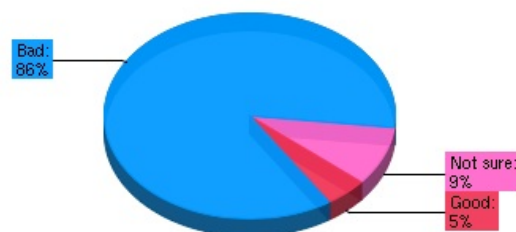
Statistics	
Total Responses	43



What other country's highways have you travelled? (check all that apply)

Value	Count	Percent %
Other African countries	16	37.2%
Europe	30	69.8%
America	37	86%
Other, please specify	5	11.6%

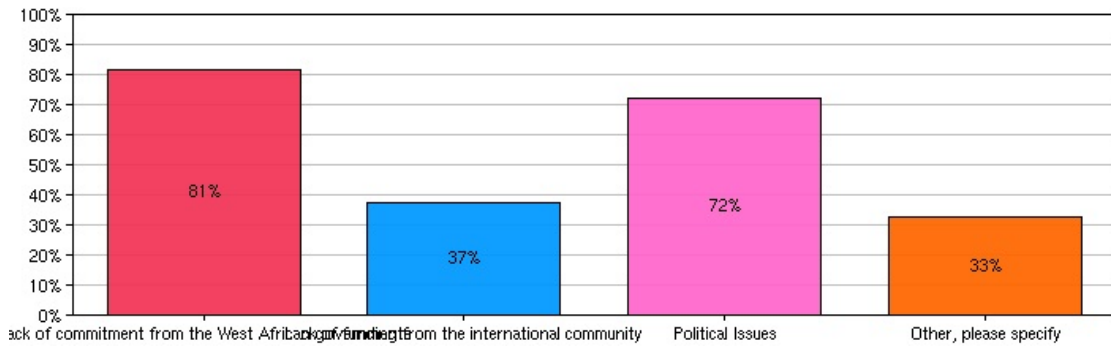
Statistics	
Total Responses	43



How do West Africa highways compare to highways in other parts of the world?

Value	Count	Percent %
Good	2	4.7%
Bad	37	86%
Not sure	4	9.3%

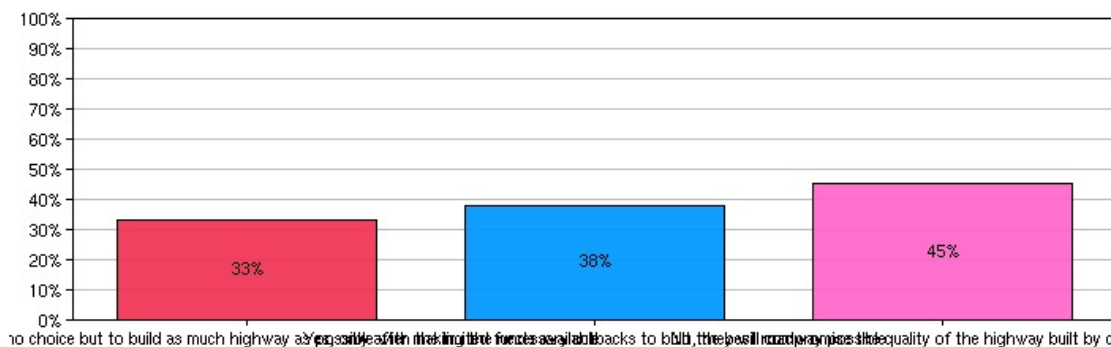
Statistics	
Total Responses	43



What are the reasons for poor highways in West Africa? (Check all that apply)

Value	Count	Percent %
Lack of commitment from the West African governments	35	81.4%
Lack of funding from the international community	16	37.2%
Political Issues	31	72.1%
Other, please specify	14	32.6%

Statistics	
Total Responses	43

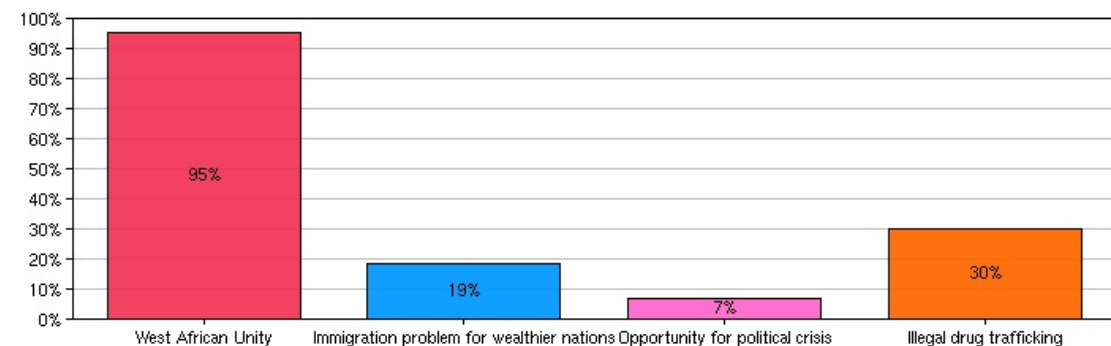


to choice but to build as much highway as possible with the limited funds available

Should West African nations undertake underfunded highway projects? (check all that apply)

Value	Count	Percent %
Yes, they have no choice but to build as much highway as possible with the limited funds available	14	33.3%
Yes, only after making the necessary cutbacks to build the best roadway possible	16	38.1%
No, they will compromise the quality of the highway built by cutting corners	19	45.2%

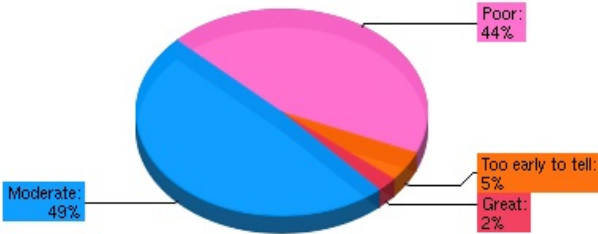
Statistics	
Total Responses	42



A first class regional highway transportation system in West Africa can potentially create (check all that apply)

Value	Count	Percent %
West African Unity	41	95.3%
Immigration problem for wealthier nations	8	18.6%
Opportunity for political crisis	3	7%
Illegal drug trafficking	13	30.2%

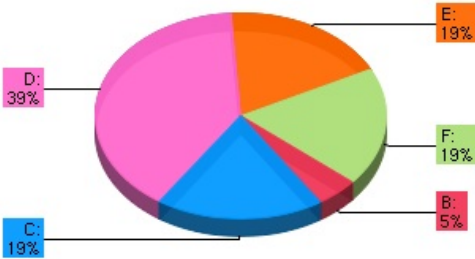
Statistics	
Total Responses	43



Africa has a poor history of international cooperation in road building. How would you consider the West African nations efforts in highway construction over the last 20 years?

Value	Count	Percent %
Great	1	2.3%
Moderate	21	48.8%
Poor	19	44.2%
Too early to tell	2	4.7%

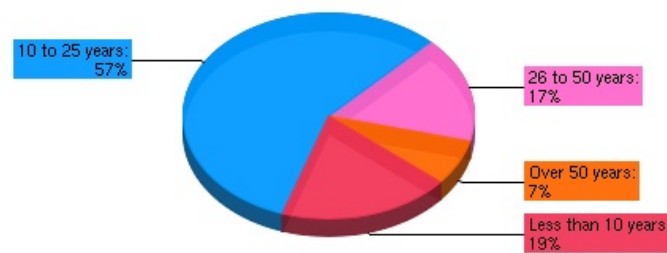
Statistics	
Total Responses	43



Assess a grade to the highways in West Africa

Value	Count	Percent %
B	2	4.7%
C	8	18.6%
D	17	39.5%
E	8	18.6%
F	8	18.6%

Statistics	
Total Responses	43



How long will it take West Africa to complete an integrated regional highway transportation system?

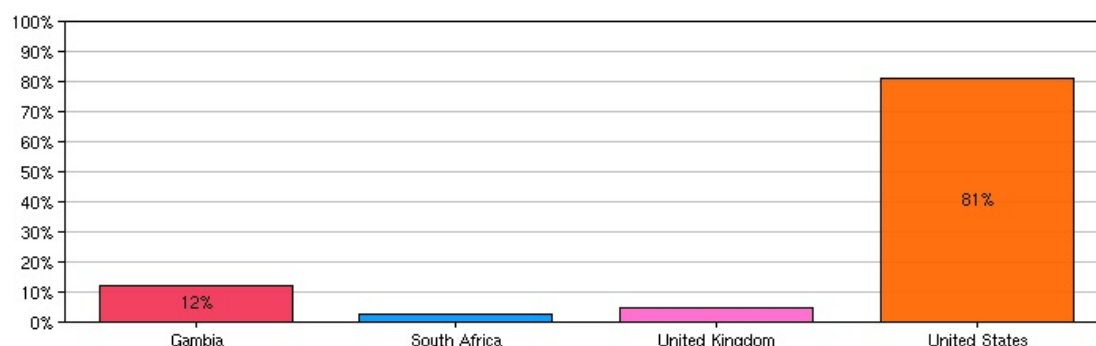
Value	Count	Percent %
Less than 10 years	8	19%
10 to 25 years	24	57.1%
26 to 50 years	7	16.7%
Over 50 years	3	7.1%

Statistics	
Total Responses	42
Sum	415.0
Average	13.4
StdDev	6.27
Max	25.0

As a traveler what are some of the improvements you would like to see on the highways in West Africa? (Optional. Please feel free to add your comments).

Count	Response
16	
1	Developed roads that are highly maintained.
1	Interconnection of highways to assist land locked countries.
1	Less check-points.
1	More check points.
1	More paved roads and better or more street lights.
1	No further comments.
1	Paved Roads
1	Potholes fix-dangerous light for night travel safety... check points are helpful
1	Properly planned and built roads to make motorists and travelers safer.
1	Quality roads that would last long, and highway lights to prevent accidents.
1	more roadway signs less check points more clean roads safe roads
1	safer and better roads.
1	I think there needs to be a coordinated effort at physically integrating our highways systems in West Africa. However, this requires political will, and championing, to ensure that West Africa is truly integrated, economically through physical integration.
1	consistent experience on whatever road you are traveling on. So you can expect safety and comfortable road conditions everywhere.
1	Better and timely maintenance to ensure safety and to prolong the durability of such investments. Enacting and properly enforcing laws that would ensure the safety of all highway users such as limiting loads being carried by freighters. Sidenote ...most highways in the gambia and senegal region are under utilized.
1	I would like to see the highways be a priority. It is not a lack of funding instead, African governments has borrowed billions of dollars for this matter. If a highway is built in want last five years. It is a shame for us after sixty or more years of independance we still can have reliable interstate Highways. Hoever, the blame should be on us student, emmigrants ,intellectual African should take responsibility of what is going on in our land and do something. What are we doing in Africa now as we speak? It is our responsibility to do something and it is now bwttter than ever to start. I invite all the African emmigrants to be proactive in group for the development of Africa. We thank you for thinking of OUR AFRICA. You are surely engaging people. That is what I meant. Great Success to your project

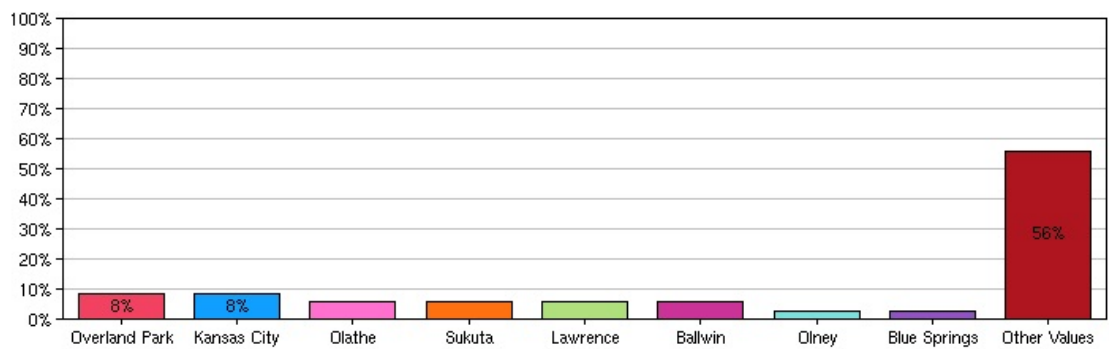
1	order and organization, wider roads, security checkpoints, clear signage, stop lights and pave crossing, rest areas and enforced highway safety
1	Some of the aforementioned points already stated i.e. road safety, ease of travel, easier and better access to other places.
1	First and Cormier. J would like to see reduce checkpoints on the interstate highways of Africa. Also roAd safety is greatly compromised with oversized loads and lack of traffic endorsements on the roads. There isles immigration endorsements than traffic
1	Less checkpoints, which cause a lot of delays. More involvement of the private sector in the management of highways.
1	Improve roof safet and travel ease. Maintain roads properly, reduce dust and pot holes, pave roads, build inter-country first-class highways
1	* Highway Reflectors * Proper Demarcation of lanes. * Enough Security * More lanes * Crossing path for pedestrian at a major town.
1	Highway in West Africa should be properly looked after by all Government and properly maintained (regular repairs). All Governments should be committed to the culture of maintenance.
1	1. Policies in place for no bribery at customs check point, applicable fees for excess bags, new clothing, lack of proper identification to avoid rules coming out of nowhere that do not even make sense. 2. Policies for not taking people's clothes, shoes or any other belonging but having travellers pay the fees/fines. 3. Posting rules, policies on any media outlet for awareness. 4. These fees and other funds/resources can be used to construct safe and reliable highways.
1	The side railing should be well secured and the weather is a big factor when it comes to maintenance. The goverment dont spend lots of money when it comes to major roads.
1	concrete with iron rodes frames under is the solution. They last longer althought more expensive. Eliminate corruption in such projects.
1	Key Changes i would like to see: Incrase safety awareness, Ease of accessibility and erected sign with well defined directions for travelers, Increase quality roads, and increase accountability to officers at check points to minimize corruption and improve traffic flow.



Source Countries

Value	Count	Percent %
Gambia	5	11.9%
South Africa	1	2.4%
United Kingdom	2	4.8%
United States	34	81%

Statistics	
Total Responses	42



Source Cities

Value	Count	Percent %
Apo	1	2.8%
Atlanta	1	2.8%
Ballwin	2	5.6%
Blue Springs	1	2.8%
Chicago	1	2.8%
Decatur	1	2.8%
Duncanville	1	2.8%
Greenville	1	2.8%
Hyattsville	1	2.8%
Independence	1	2.8%
Johannesburg	1	2.8%
Kansas City	3	8.3%
La Vergne	1	2.8%
Lawrence	2	5.6%
London	1	2.8%
Louisville	1	2.8%
Lynnwood	1	2.8%
Manchester	1	2.8%
Mission	1	2.8%
Olathe	2	5.6%
Olney	1	2.8%
Overland Park	3	8.3%
Pasadena	1	2.8%
Portland	1	2.8%
Saint Charles	1	2.8%
Silver Spring	1	2.8%
Sukuta	2	5.6%
Tyler	1	2.8%

Statistics	
Total Responses	36

No Data Available

APPENDIX G

Summary of Responses - Cross Tabulation



Online Surveys, Data Collection and Integration
www.SurveyGizmo.com

Cross Tab Report - Ease of Travel Versus Missing links

Highway travelled versus Highway conditions

		How would you describe the ease of travel on the highway?				
		Total	Extremely Easy	Easy	Difficult	Extremely Difficult
	h%	100%	%	%	%	%
	v%	100%	%	%	%	%
	index	100				
		42	1	10	23	8
Were there missing links on the highway?	No, there were none.	11	1	7	3	0
	h%	100%	9.1%	63.6%	27.3%	0.0%
	v%	26.2%	100.0%	70.0%	13.0%	0.0%
	index	100	382	267	50	N/A
	Yes, I had to use a ferry to cross a river	27	0	2	18	7
	h%	100%	0.0%	7.4%	66.7%	25.9%
	v%	64.3%	0.0%	20.0%	78.3%	87.5%
	index	100	N/A	31	122	136
	Yes, I had to get on a one-lane bridge or "makeshift" bridge	4	0	1	2	1
	h%	100%	0.0%	25.0%	50.0%	25.0%
	v%	9.5%	0.0%	10.0%	8.7%	12.5%
	index	100	N/A	105	91	131

h% - Horizontal Percentage. The percentage of people who have a certain characteristic defined by a row heading.

v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.

i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways; both horizontally or vertically.

* - Index values are not available, as one of the variables is populated from a multiple-select question.

Cross Tab Report - Ease of Travel Versus Safety

Highway travelled versus Highway conditions

		How would you describe the ease of travel on the highway?				
		Total	Extremely Easy	Easy	Difficult	Extremely Difficult
	h%	100%				
	v%	100%				
	index	100				
		42	1	10	23	8
Describe travelling on the highways in West Africa	Safe	15	0	8	5	2
	h%	100%	0.0%	53.3%	33.3%	13.3%
	v%	35.7%	0.0%	80.0%	21.7%	25.0%
	index	100	N/A	224	61	70
	Extremely safe	2	1	0	1	0
	h%	100%	50.0%	0.0%	50.0%	0.0%
	v%	4.8%	100.0%	0.0%	4.3%	0.0%
	index	100	2,100	N/A	91	N/A
	Unsafe	16	0	2	12	2
	h%	100%	0.0%	12.5%	75.0%	12.5%
	v%	38.1%	0.0%	20.0%	52.2%	25.0%
	index	100	N/A	53	137	66
	Extremely unsafe	9	0	0	5	4
	h%	100%	0.0%	0.0%	55.6%	44.4%
	v%	21.4%	0.0%	0.0%	21.7%	50.0%
	index	100	N/A	N/A	102	233

h% - Horizontal Percentage. The percentage of people who have a certain characteristic defined by a row heading.

v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.

i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways; both horizontally or vertically.

* - Index values are not available, as one of the variables is populated from a multiple-select question.

Highway travelled versus Highway conditions

h% - Horizontal Percentage. The percentage of people who have a certain characteristic defined by a row heading.
v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.
i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways; both horizontally or vertically.
* - Index values are not available, as one of the variables is populated from a multiple-select question.

v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.

i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways: both horizontally or vertically.

* - Index values are not available, as one of the variables is populated from a multiple-select question.

Cross Tab Report - Highway traveled Versus Missing links

Highway travelled versus Highway conditions

Have you travelled on the following West Africa highways? (check all that apply)					
		Total	Trans-West African Coastal Highway / Dakar – Lagos Highway	Dakar – Ndjamena Highway	Other, please specify
	h%	100%	%	%	%
	v%	100%	%	%	%
	index	100			
		45	16	11	18
		11	6	3	2
Were there missing links on the highway?	No, there were none.	h%	54.5%	27.3%	18.2%
		v%	37.5%	27.3%	11.1%
		index	153	112	46
			8	7	15
	Yes, I had to use a ferry to cross a river	h%	26.7%	23.3%	50.0%
		v%	50.0%	63.6%	83.3%
		index	75	95	125
			2	1	1
	Yes, I had to get on a one-lane bridge or "makeshift" bridge	h%	50.0%	25.0%	25.0%
		v%	12.5%	9.1%	5.6%
		index	141	102	63

h% - Horizontal Percentage. The percentage of people who have a certain characteristic defined by a row heading.

v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.

i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways; both horizontally or vertically.

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Cross Tab Report - Past 20 year effort Versus Highway conditions

Highway travelled versus Highway conditions

		What were the highway conditions?			
		Total	Poor	Good	Excellent
	h%	100%	%	%	%
	v%	100%	%	%	%
	index	100			
		43	30	13	0
Africa has a poor history of international cooperation in road building. How would you consider the West African nations efforts in highway construction over the last 20 years?		1	0	1	0
	Great				
	h%	100%	0.0%	100.0%	0.0%
	v%	2.3%	0.0%	7.7%	0.0%
	index	100	N/A	331	N/A
		21	10	11	0
	Moderate				
	h%	100%	47.6%	52.4%	0.0%
	v%	48.8%	33.3%	84.6%	0.0%
	index	100	68	173	N/A
		19	19	0	0
	Poor				
	h%	100%	100.0%	0.0%	0.0%
	v%	44.2%	63.3%	0.0%	0.0%
	index	100	143	N/A	N/A
		2	1	1	0
	Too early to tell				
	h%	100%	50.0%	50.0%	0.0%
	v%	4.7%	3.3%	7.7%	0.0%
	index	100	72	165	N/A

h% - Horizontal Percentage. The percentage of people who have a certain characteristic defined by a row heading.

v% - Vertical Percentage. The percentage of people who have a certain characteristic defined by a column heading.

i - Index. This number indicates selectivity; that is, which group, compared to the total, meet the criteria of the horizontal and the vertical characteristics. The index works both ways; both horizontally or vertically.

* - Index values are not available, as one of the variables is populated from a multiple-select question.